

THE
MINERAL WATERS OF VICHY

DR. C. E. CORMACK,
Laureate of the Faculty of Paris.



22101357615

16

H 8.545

d C 40

9.VII.02
B.Z.A.B.

478



THE
MINERAL WATERS OF VICHY



54200

Dr. Finlayson
With the Author's comp.
THE
W. C. Cormack

MINERAL WATERS OF VICHY

AND THE

DISEASES IN WHICH THEY ARE INDICATED

FOLLOWED BY

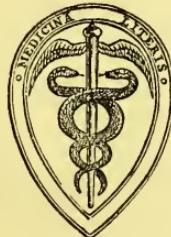
A SKETCH OF SOME OF THE PRINCIPAL EXCURSIONS IN
THE ENVIRONS

WITH TWO COLOURED MAPS



DR. C. E. CORMACK

LAUREATE OF THE FACULTY OF MEDICINE OF PARIS; CONSULTING PHYSICIAN AT
VICHY DURING THE SUMMER, AND PRACTISING AT HYÈRES
(VAR) DURING THE WINTER



LONDON

J. & A. CHURCHILL
11, NEW BURLINGTON STREET

9851042

M17468

WELLCOME INSTITUTE LIBRARY	
Coll.	welMOMec
Call	
No.	WB760
	EE7
	188X
	C 81m

P R E F A C E.

YEAR by year the number of visitors frequenting this station steadily increases, and while almost every nationality is annually represented in a larger proportion, there is one exception to the general rule, the number of English tends to decrease and is considerably less than it was ten years ago. Why it should be so, it is hard to say, considering the great value of its thermal springs in the treatment of numerous diseases to which our countrymen are particularly exposed, and the facilities for making the journey thither.

It has been suggested to me, that while a great number of French works have been written upon these Waters, there are comparatively few English ones on the same subject, and that if the English were able to consult a work in their own tongue, written in a popular style, with a minimum of scientific terms, containing a digest of what some of the greatest authorities have written upon the Vichy Waters, it could not fail to draw the attention of our countrymen to what most of them certainly ignore, the great efficacy of these Waters in the treatment of a number of complaints which we describe.

This little work is in two parts, and has been composed not so much for the medical profession as for the public ; and we have endeavoured to explain in popular language where the thermal treatment is indicated, and how the Waters operate.

The Vichy Waters are alkaline, and contain on an average 5 grammes of bicarbonate of soda per litre. There are numerous springs, varying slightly in composition but more particularly in temperature. We give the analysis and temperature of each spring, and also their individual indications, when they have any, and in a general way indicate why the preference should be given to one spring rather than to another in certain diseases, or during certain complications of these diseases.

After treating upon the generalities of the Vichy thermal Waters, and describing each individual spring, we have explained the use of these Waters, how they are employed internally and externally ; and before passing to the diseases which are treated at this station, we have given some general hints on hygiene which the patient would do well to follow.

In describing the different complaints which may be relieved by the thermal treatment, we have avoided touching upon any treatment accessory to it. To have gone into such details would have been of no advantage to the patient, and would have necessitated a very much larger work.

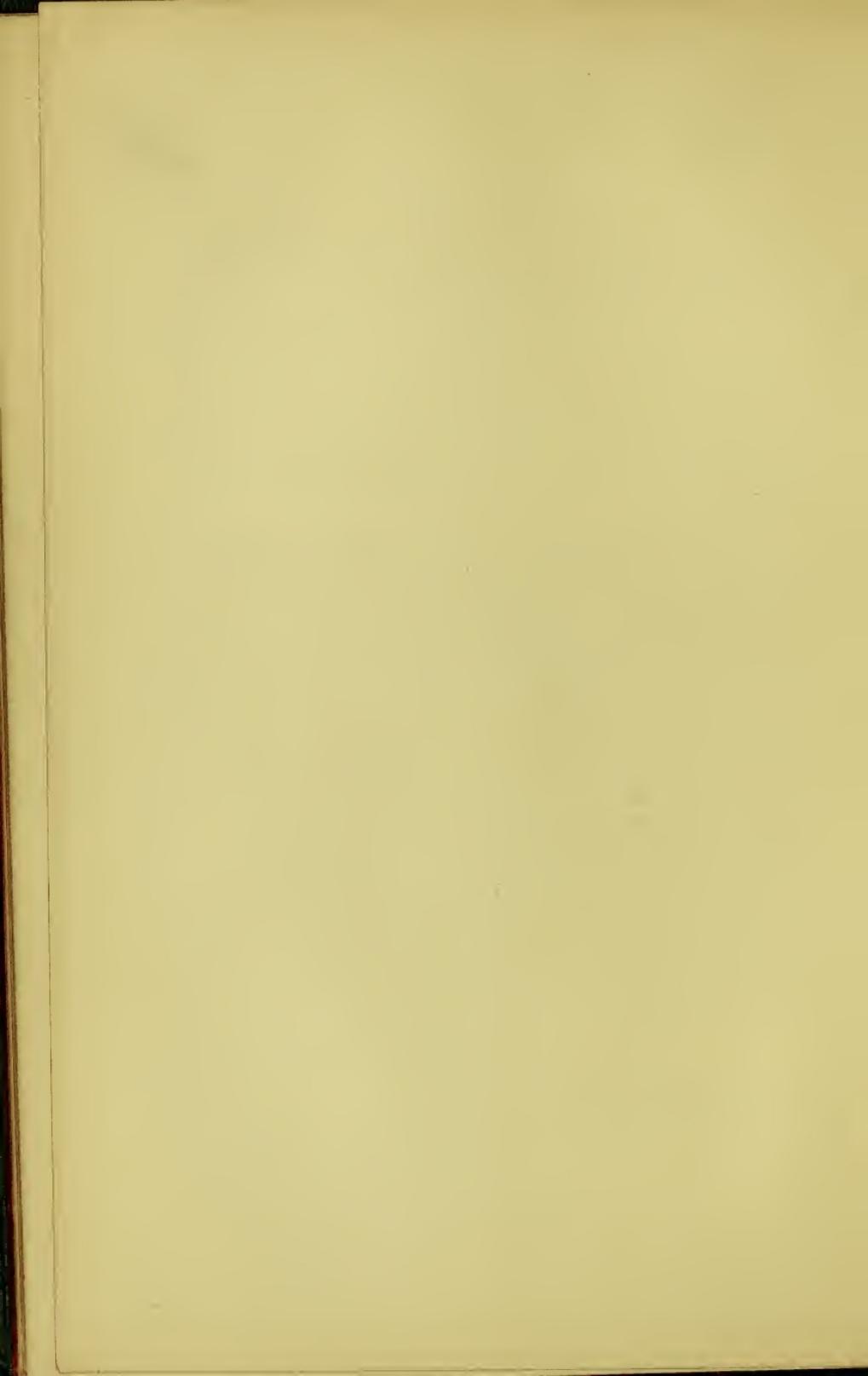
The second part of this work is intended to show the visitor how he may pass agreeably his leisure, and assist his cure. It is to a certain extent an adjvant to the treatment, and after giving certain explanations concerning the journey, &c., and some details about the town, and the amusements to be had there, we have described a number of most delightful promenades in the environs.

Two maps will be found in this volume. The first a plan of the town, the second a map of the neighbourhood showing the carriage roads and paths to the different places described in the excursions. These maps have been executed especially for this work, and we trust that the visitors to Vichy will find them useful. We have avoided encumbering the map with too many names, as taking away from its clearness, and for the same reason omit the mountain ranges.

Should this work be the means of inducing more of our countrymen to come to Vichy, and assist them by the contents of the second part to pass their time pleasantly while there, the author's object will have been accomplished.

CH. E. CORMACK.

VILLA FAUBERT, VICHY;
1887.





CONTENTS.

PART I.

CHAPTER I.

VICHY AND ITS ORIGIN	1
--------------------------------	---

CHAPTER II.

GENERALITIES UPON THE MINERAL WATERS OF VICHY	10
---	----

CHAPTER III.

THE THERMAL SPRINGS OF VICHY CONSIDERED INDIVIDUALLY	22
--	----

CHAPTER IV.

THE DIFFERENT WAYS IN WHICH THE VICHY WATERS ARE EMPLOYED	70
A. Internal Treatment	71
B. External Treatment—Baths, Douches	79
C. Carbonic Acid Treatment	89

CHAPTER V.

HYGIENE AND DIET	93
----------------------------	----

CHAPTER VI.

	PAGE
DISEASES TREATED AT VICHY	108
Disorders of the Stomach :	
A. Dyspepsia	108
B. Gastralgia	117

CHAPTER VII.

DISEASES OF THE INTESTINES	121
A. Enteritis	121
B. Dysentery	124
C. Constipation	126

CHAPTER VIII.

UTERINE DISEASES—METRITIS	128
-------------------------------------	-----

CHAPTER IX.

DISEASES OF THE LIVER	137
A. Congestion of the Liver	137
B. Hepatitis	141
C. Biliary Lithiasis—Gall-stone Colic	142

CHAPTER X.

DISEASES OF THE URINARY ORGANS	149
A. Renal Lithiasis—Gravel—Nephritic Colics	149
B. Albuminuria—Bright's Disease	157
C. Vesical Catarrh—Chronic Cystitis	165

CHAPTER XI.

GOUT	170
----------------	-----

CONTENTS.

xi

CHAPTER XII.

A. CHLOROSIS—GREEN SICKNESS—ANÆMIA	188
B. CONGESTION OF THE SPLEEN—MALARIA—INTERMITTENT FEVER	193

CHAPTER XIII.

DIABETES MELLITUS	199
-----------------------------	-----

PART II.

CHAPTER I.

GENERAL INFORMATION	235
-------------------------------	-----

CHAPTER II.

VICHY TOWN	255
----------------------	-----

CHAPTER III.

A. THE THERMAL ESTABLISHMENT OF VICHY	268
B. THE CASINO	279

CHAPTER IV.

PROMENADES IN THE ENVIRONS OF VICHY	290
The Montagne Verte	290
The Vesse Intermittent Spring	291
Cusset	294
Malavaux	296

	PAGE
L'Ardoisière	300
Côte St. Amand	304
Hauterive	307
Le Puys-Grenier	308
Maulmont	310
Randan	314
Billy Castle	317
Thiers	322
La Palisse	326
Effiat	333
Gannat—Pont de Rouzat	336
Bourbon-Busset Castle	341
Châteldon	346
Clermont-Ferrand	351
Royat	356
Puy-de-Dôme	360
Ébreuil	361
Veauce	362
Chantelle	364

THE
MINERAL WATERS OF VICHY.

CHAPTER I.

VICHY AND ITS ORIGIN.

VICHY is situated upon the south bank of the River Allier, in the Department of Allier, in the centre of a valley, surrounded on every side by small hills. It is one of the most popular and frequented watering stations in France, owing to its numerous mineral springs and their great efficacy in the treatment of numerous disorders, of which we shall treat in another chapter.

Vichy is 237 miles south-east of Paris, about 40 miles south of Moulins, and 114 miles distant from Lyons. Its climate is very similar to that of Paris. The proximity of the Auvergne mountains is a cause for frequent violent storms. No endemic diseases are known in the locality. The barometer reading is

generally about 735 mm., and the town stands at about 282 yards above the level of the sea.

We will not stay to discuss the geological stratas upon which the town is built, and from which the different springs rise. We give the analyses and properties of these springs in another part of this work, and will only casually mention here, that at no very considerable depth beneath the surface of the ground lies an enormous expanse of water, the quantity of which it is impossible to form an approximate idea. This is easily proved by borings; an artificial spring can be produced almost anywhere in and around the town by this means, the mineral springs thus obtained being very closely allied to each other as far as their constituent parts are concerned. They are all rich in bicarbonate of soda and carbonic acid gas; what varies most is their temperature. The State, recognising the prejudice that would be caused to the town were everyone free to make borings, has wisely passed a law forbidding any borings for new springs in Vichy or within some miles outside of the town. This is a greater boon to the health-seeking visitors than at first sight appears, for had every individual a right to open a spring of his own, all control over the genuineness and quality of the different waters would be lost, and the guarantee and protection which they have now from the Compagnie Fermière would run the risk of being weakened by spurious waters being passed off as genuine.

It is a much debated question how and from what

source Vichy derived its name. The most generally-accepted opinion, however, appears to be, that it is derived from the Latin "Vicus Callidus." It appears pretty conclusively proved, at any rate, that it is of Celtic origin, from the different coins, inscriptions, pottery, &c., that have been discovered from time to time both in the town and in its environs. No positive data are, however, forthcoming, by which it is possible to fix the actual era in which the town arose, and very little is known about it until the eleventh century.

We know that in the Middle Ages Vichy was divided into four distinct parts : 1st. Le Moustier ; 2nd. Ville aux Juifs ; 3rd. La Ville, and 4th. Le Château Franc.

The thermal establishment and its annexes now occupy what was previously known as Le Moustiers. The Ville aux Juifs was situated between Vichy and Cusset. La Ville, as far as the town is concerned, has entirely disappeared, whereas Le Château Franc, built upon a mass of calcareous rocks, formed by a déposit of the Celestins (mineral) waters, is now the site of Old Vichy.

The Bourbon Dukes played an important part in its history at this time ; again, in more recent times Vichy was the theatre of many bitter and sanguinary disputes between the Catholic and Protestant parties —the town suffered much from pillage and sacking. In the seventeenth century, in the reign of King Henry III, a small house with a couple of baths, comprising a system of douches, was built, and a little

later, in 1675-6, Madame de Sévigné visited the town to undergo the water treatment.

So charmed was Madame de Sévigné with the beauties of the town, the lovely scenery around it, the fine woods and the verdant aspect of the country, and the beneficial effects she derived from the waters, that she wrote many rapturous letters to friends describing her treatment, her impressions, &c.

From this moment Vichy may be said to have existed, in the popular acceptation of the word; for although from time immemorial its springs had been employed, their uses had been limited, and almost entirely restricted to those people living in close proximity to them.

Madame de Sévigné's letters found their way to Paris, and so much wit and humour were discovered in them that they passed, so to speak, from hand to hand. We subjoin a translation of one of them; the original will be found at foot of page 5.

"I commenced to-day the douche; it is a fairly good rehearsal of purgatory. One is perfectly naked *in a small subterraneous place*, where you find a pipe of hot water, which a woman plays upon you where you like. This state, where you hardly keep on a fig leaf, by way of all attire, is sufficiently humiliating. Somebody is behind a screen who keeps up your courage for the space of half-an-hour; this person, for me, was a doctor of Gannat, that Mme. de Noailles has brought each time to her baths, whom she likes very much, who is a very decent fellow, not at all a char-

latan, with nothing to preoccupy him. She sent him to me out of pure genuine friendship. I keep him, at no matter what cost, for the doctors of this place are insupportable, and this man amuses one. He is not the least bit like a nasty doctor : he is witty, honest, he knows the world ; in fact I am pleased with him.

“ So he used to speak to me when I was undergoing my torture. Figure to yourself a jet of water against some unfortunate part of your body as boiling as it is possible for you to imagine. They commence by alarming every part so as to make one dance, and then they direct their attention to the joints that have been attacked, but when they get at the base of the neck it is a kind of fire and surprise which cannot be understood. That, however, is the knot (essential) of the whole affair. One must support everything, and one bears all and is not in the least burnt, and then one gets into a warm bed, where one perspires freely, and in this wise you are cured. Here again my doctor is kind ; for, instead of leaving me to a two hours’ ennui, which is inseparable from the perspiration, I get him to read to me, and it amuses me. To finish, I shall continue this life for seven or eight days, during which I thought I was to drink ; but they will not allow it—it would be doing too much, so my journey is thus somewhat lengthened.” *

* “ J’ai commencé aujourd’hui la douche : c’est une assez bonne répétition du purgatoire. On est tout nue dans *un petit lieu souterrain*, où l’on trouve un tuyau de cette eau chaude, qu’une femme vous

We would observe that Madame de Sévigné's remarks concerning the place and mode of applying the douche are no longer valid. Nothing could be more comfortable than the present organisation of the baths.

It was not, however, until 1829 that Vichy can be said to have had a proper thermal establishment. It was in 1814 that the Duchesse d'Angoulème laid the foundation-stone of the present building, which was completed by the architect Beauvais in 1829. At the

fait aller où vous voulez. Cet état, où l'on conserve à peine une feuille de figuier pour tout habillement, est une chose assez humiliante. Derrière un rideau se met quelqu'un qui vous soutien le courage pendant une demi-heure; c'était pour moi un médecin de Gannat, que Mde. de Noailles a mené à toutes ses eaux, qu'elle aime fort, qui est un fort honnête garçon, point charlatan, *ni préoccupé de rien*, qu'elle m'a envoyé par pure et bonne amitié. Je le retiens, m'en dut-il coûter mon bonnet, car ceux d'ici me sont entièrement insupportables, et cet homme m'amuse. Il ne ressemble point à un vilain médecin; il a de l'esprit, de l'honnêteté; il connaît le monde; enfin j'en suis contente.

“Il me parlait donc pendant que j'étais au supplice. Représentez-vous un jet d'eau contre quelqu'une de vos pauvres parties, toute la plus bouillante que vous puissiez imaginer. On met d'abord l'alarme partout pour mettre en mouvement tous les esprits, et puis on s'attache aux jointures qui ont été affligées; mais quand on vient à la nuque du cou, c'est une sorte de feu et de surprise qui ne peut se comprendre; c'est là cependant le nœud de l'affaire. Il faut tout souffrir, et l'on souffre tout, et l'on n'est point brûlée, et l'on se met ensuite dans un lit chaud, où l'on sue abondamment, et voilà ce qui guérit. Voici encore où mon médecin est bon, car, au lieu de m'abandonner à deux heures d'un ennui, qui ne se peut se séparer de la sueur, je le fait lire et cela me divertit. Enfin je ferai cette vie pendant sept à huit jours, pendant lesquels je croyais boire; mais on ne veut pas, ce serait trop de choses; de sorte que c'est une petite allonge à mon voyage.”

same time the walls which encircled the town, constructed under Louis II, were thrown down, and the trenches filled up. The hospital, constructed under Louis XIV, and which was then in a dilapidated condition, was rebuilt, and the new town of Vichy replaced the old.

Its popularity, however, increased tenfold when Napoleon III passed a season here in 1861. Every year from that date until 1865 Napoleon III undertook the most elaborate improvements, had parks laid out, the banks of the river raised, and drew attention to the marshy condition of the country along the banks of the river. He had this state of matters changed, and whatever opinion the Vichy inhabitants may have of him in other matters they owe him a deep debt of gratitude for what he did for the town, for it is in great part due to him that Vichy is now in such a prosperous condition.

We cannot do better in closing this chapter than give the translation of what Mr. Henry d'Ideville writes upon the transformation of Vichy consequent upon the Emperor's visit :

"With the Emperor Napoleon III Vichy has suddenly undergone a change in appearance and in fortune, just as his Napoleonic Majesty had but to appear at Marly and at Versailles to create these places. There, where for centuries the river had been forming banks upon banks of sand, the new Sovereign has caused a magnificent park to arise, intersected by numerous shady alleys, and adorned with lakes and

green lawns, the whole being protected from the encroachments of the river by an embankment 1600 mètres in length, the splendid work of the State engineers.

“The Emperor came to Vichy for the first time in 1861. The country pleased him; he hoped to get back his health there. This was the reason of his liking, and of the violent fancy he took for this thermal station, which, thanks to him, was entirely metamorphosed, endowed with roads, promenades, and buildings.

“In 1864, by order of the Sovereign, the Compagnie Fermière had constructed a large, elegant, and comfortable Casino, to which the privilege of working the mineral springs possessed by the State was renewed, a privilege which had been conceded in 1853. Hotels rose as by magic on the sides of the Nouveau Park. Napoleon III, having chosen Vichy for his summer quarters, naturally attracted to the same spot the usual troop of courtiers, admirers, &c., who are always ready to follow the lead of royalty.

“Napoleon III lived very simply at Vichy. He caused two chalets to be built alongside the park, very comfortable, but with no pretensions to luxury. Every year he spent a month there, the Empress rarely appearing with him. As a general rule His Majesty came accompanied only by General Fleury, a few of the ordonnance officers, and a piquet of the Cent-Gardes. We must admit that the sojourn of the Emperor and his suite changed considerably the

quiet and somewhat severe appearance of the town. Distinguished foreigners, artists, and politicians cast their eyes towards this residence, and during the Imperial month the avenues of the park had quite a particular aspect.

"There was reason to fear for a moment that the unfortunate war of 1870, with its fatal consequences to France, would lessen the prosperity of the station. Nothing of the kind. Since 1870 the number of bathers at Vichy has doubled, and the reason is easy to understand, for, not to speak of the efficacy of its marvellous waters, which have not their equal, we believe; but at Carlsbad, patriotic reasons have contributed to attract many French who have been accustomed to frequent the German spas.

"The great number of doctors at Vichy is explained by the truly prodigious number of patients who come to drink the waters, and who for the most part return home radically cured. Unfortunately a number of them return next season, having neglected to follow the strict and rigorous régime ordered by the medical celebrities of the place. Once at home they return to their ordinary way of living and all has to be commenced afresh."

CHAPTER II.

GENERALITIES UPON THE MINERAL WATERS OF VICHY.

THE mineral springs of Vichy are all closely allied in composition; there are slight differences in taste and smell, but what most distinguishes one spring from another is of a purely physical nature, viz. the temperature.

A certain number of the springs belong to the State; these are :

- La Grande Grille.
- Le Puits Carré.
- Le Puits Chomel.
- Les Celestins (three springs).
- Source de l'Hôpital.
- Source Lucas.
- Source du Parc.
- Source Mesdames.
- Source de Hauterive.

Others belong to private individuals :

- Source Larbaud aîné.
- Prunelle.
- Vesse.
- Lardy.

Sainte Marie,	at Cusset.	
Elisabeth,		
Tracy,		
St. Jean,		
Dubois,	belonging to M. Larbaud- St. Yorre.	
Source Larbaud-St. Yorre,		
Source des Acacias,		
Nouvelles Sources de Vichy (three springs),		
Sources des Pionniers (three springs),	St. Yorre.	
Source des Graviers,		
Source Mallat.		
Source Guerrier.		
Source Forissier.		
Source Charnaux.		

Many of these springs are natural, *i. e.* spring up naturally from the ground, while others are artificial, and obtained by borings, and constitute what are termed artesian wells.

The springs of Vichy and its environs have one common origin, they all rise from beneath the alluvial or lacustrian soil forming the bottom of the Valley of the Allier, where they probably form an immense underground lake, and they issue above ground either through natural or artificial orifices.

M. Dufrénois, general inspector of mines, in the report he sent to the Minister of Agriculture and Commerce in 1852, on the Vichy waters, writes thus: (translation.)

“ Whenever one has bored within a radius of about

10 kilometres of the springs of Vichy, gaseous alkaline springs have been discovered analogous to those of Vichy. Thus there is a vast quantity of mineral water in this basin. The borings have proved that all these springs rise from the alluvial soil which covers the valley of the Allier; they have been stopped at a layer of red clay, which appears to exist everywhere at the same level, dividing the alluvial soil into two parts. The bore after having pierced this layer has always brought up analogous sands to those of the upper part. Thus one may consider the alluvial soil situated beneath the layer of clay as forming a kind of sponge, which receives the mineral waters of the ascending shaft and conducts them to the surface.

“ This disposition of the mineral waters of Vichy differs essentially from that of the mineral waters of mountainous countries, especially those of the Alps, the Pyrenees, Mont Dore, and the Vosges. These spring up direct from crystalline rocks; thus, by means of subterraneous galleries, in general but of short length, one can get to their origin, circumvent all the small streamlets, unite, and capture them.”

M. Bouquet asserts that it is impossible to doubt but that these thermal waters are all derived from the alluvial soil, and are really of geological formation, the same as the crystallised rocks. They take hardly anything from the superior layers of clay and calcareous layers; on the contrary, they form a

deposit which, little by little, forms a solid and thick layer, which lines the side of the orifice by which they escape from the soil. So considerable is this deposit in certain of the springs, that the pipes would become blocked up if care were not taken to keep them free.

The essential chemical character of all the Vichy springs is the vast proportion of bicarbonate of soda which they contain, and which gives them the first place amongst mineral waters. This salt is to be found in quantities varying from $4\frac{1}{2}$ to $5\frac{1}{2}$ grammes per litre, according to the spring, the average being 5 grammes, or a little under $1\frac{1}{2}$ drachms per quart. Iron is also to be found in variable quantities, and arsenic from 1 milligramme to 3 milligrammes per quart. The different salts are held in a state of dissolution by an excess of carbonic acid gas, in which all the springs are very rich.

A great deal has been said lately for and against these springs, from their very richness in bicarbonate of soda, in the treatment of chlorosis (green sickness). We think that the chemical action of the water has not been properly understood, and a few words of explanation on this subject will not be out of place here. In the first place, we allow that there is chlorosis and chlorrosis, that is to say, maladies which, while bearing the same name, differ essentially according to their origin. We will discuss that point when treating the subject of chlorosis, what we would say now is that in the vast majority of cases nothing could be more

conducive to a cure, or at any rate to a great improvement in the symptoms, than the use of these waters. It is easy to explain their action in a general way.

The tendency that the blood has to coagulate spontaneously in all cases of cachexia has long since been proved by clinical study. Different opinions have been given to explain this tendency to coagulation, but the one most generally credited is, that the fibrin and fibrogenous elements are in excess. If this be the correct view, it stands to reason that we should endeavour to diminish the quantity of fibrogenous matters contained in the blood. We obtain this result by the use of the Vichy waters.

These alkaline mineral waters act upon the whole mass of the blood ; they accelerate the circulation by defibrinating the blood or by preventing a production of fibrine in excess, which keeps up or aggravates the disease. The blood thus becomes more fluid, and for this very reason some physicians consider that the use of an alkaline water is contra-indicated ; but they have not fully considered the further action of the waters, and the fluidity of blood need cause no alarm if the patient does not exceed the quantity he is ordered to take, for the further action of the water is tonic and stimulating. The iron and arsenical constituents of the water play also an active part in the nutrition and in the formation of red blood-corpuscles.

Thus in this class of affections it is clearly indicated (as has been proved by experiments performed by

Professor Gavarret and M. Anstral) to increase the fluidity of the blood, which result is most easily obtained by the use of these waters. Admitting that the blood is already too fluid in these disorders, it is at the same time too rich in fibrogenous matters, which interfere with the circulation and prevent the blood from acquiring its proper tone.

Its action is not exclusively confined to rendering the blood more fluid by its alkaline properties, but it has a marked and otherwise important action by its iron and arsenic, which, under the action of the carbonic acid, aid the assimilation, and tend to increase the number of red blood-corpuscles. The way in which the iron is assimilated with the carbonic acid, gives it the superiority over the artificially prepared medicaments containing iron, and which frequently are not digested.

M. Bouquet has estimated the quantity of salts supplied by all the Vichy springs together. The figure he arrives at is most formidable; according to him the daily yield is about 5102 kilogrammes, which would make a grand total of 1,861,230 kilogrammes yearly. The Thermal Company manufactured 19,112 kilogrammes in 1885, and considering what a very small quantity comparatively of the waters it employed to extract this large quantity of salts, we should think that M. Bouquet's estimate cannot be far out. Few places in Europe could be mentioned enjoying such an accumulation of wealth in the shape of mineral waters.

We have said that the temperature of these springs varies considerably, from 10° Centigrade to 46°, or in Fahrenheit from 50° to 115°. Doubtless the difference in temperature depends upon what course they follow under ground, the length of their passage in the cooler strata, and also to a certain extent by the comparative preponderance of certain products, such as iron, sulphur, organic matter, &c.

As a general rule the most abundant springs are those having also the highest temperature, while those giving the lowest yield are the coolest. For example, the Puits Carré and the Grande Grille, which give respectively a daily supply of 240,000 litres and 96,000 litres, have a temperature of 46° and 40° Centigrade. The Celestins, producing daily 25,000 litres, have but a temperature varying from 15° to 16° Centigrade.

When poured into a glass the water is clear, limpid, and effervescent, and numbers of small bubbles will be seen escaping from the body of the water, while others cling to the sides of the glass. These bubbles are caused by the excess of carbonic acid which the water contains.

They have a slightly soapy taste, more or less perceptible according to the quantity of carbonic acid, the savour is slightly nauseous, and some of them have a decidedly unpleasant smell of sulphuretted hydrogen, particularly those of the Parc, Lardy, Chomel, Vesse, and Lucas springs. This smell will generally disappear in the course of a few minutes if

the glass be allowed to stand. The presence of the sulphuretted hydrogen is easily demonstrated by plunging a silver article into the water, which will be found quite black when taken out.

The Vichy waters have a special action other than that of being an excitant, which is a common property of all mineral waters; they give rise to chemical changes in the system by their alkaline properties.

With all patients it is remarked that the whole of the secretions become alkaline, even those which are normally acid, such as the urine and the perspiration, and this, no matter what may be the malady for which the patient is being treated, or from what spring he may be drinking.

The bicarbonate of soda is eliminated from the system principally by means of the kidneys, and its presence in the urine is by no means a proof of saturation. The urinary secretion varies normally from 1200 to 1500 grammes (42 to 50 ounces) per twenty-four hours, and it is only natural that the bicarbonate of soda should be more concentrated when it arrives in the urine than in the blood, and consequently that the chemical action will be more energetic in the urinary system than in the circulatory system. We shall revert to this subject when speaking of stone in the bladder and gravel.

Experience has proved that the urine can remain alkaline for months, not only without giving rise to any accidents, but assisting, on the contrary, the return to health.

As the secretions are modified so is the blood, which becomes more charged with alkaline principles; but if one bears in mind that the quantity of alkaline elements in the different humours of the body far exceeds that of the acid elements, and that the organic reactions and changes take place in a medium that is normally alkaline, one will understand that, even supposing the alkalies to be in excess, the danger will be less than if the acid elements were in excess, and how it is possible to exaggerate the first without causing any unfavorable effect on the general health.

By their exciting and tonic properties, these waters are contraindicated in all acute inflammatory maladies, and in chronic inflammations which have a tendency to become acute afresh; they are indicated on the contrary in chronic affections, which have not this tendency, and whenever one desires to stimulate a particular organ, to accelerate the circulation, excite the secretions and regulate the nutrition and assimilation. By their chemical properties they are indicated in certain cases of congestion, biliary calculi, complaints of the liver, gravel, stone in the bladder, chronic cystitis, gout, rheumatism, diabetes, &c.

Mr. Lucas, in speaking of the Vichy waters, says : (translation.)

"The Vichy waters present a far more important difference in their therapeutic uses than one could have supposed from their chemical analysis, and

although it is difficult to show *à priori*, the reason of these differences, numerous observations, repeated during twenty-three years, leave me without a doubt on this point."

According to the constitution of the patients and the nature of their maladies, the same spring will excite the one and calm the other, cause lethargy in this case, restlessness in that, in the one diarrhoea, in the other constipation, calm pains here, cause pains there, strengthen the one and weaken the other. Sometimes it will produce a tendency to obesity, while with another person it has an entirely opposite effect. Thus it is essential that no patient should treat himself, but confide his case to some medical man who has made these waters his study, and who, by following the patient during the whole course of his treatment, can at any moment modify the treatment when he sees the occasion and advisability for so doing, and of which he alone is able to judge. A patient who takes his case into his own hands, and treats himself by drinking at this or that spring by the advice of some non-professional friend, invariably comes, soon or late, under the doctor's hand, and generally with aggravated symptoms. He learns too late that the waters are not so harmless as they appear to be, and not only will he have wasted his time, but perhaps be obliged to go to some other station to try and remedy the effects of his folly. These cases occur constantly.

We will close this chapter by relating the condi-

tions under which the Thermal Company holds the privilege of working the springs conceded to it.

To prevent these springs being sapped or deteriorated in any way, a law has been passed by which it is forbidden for anyone to bore for new springs, or make any excavations in the soil within the town of Vichy and a certain radius beyond its limits. Without this precaution new springs would be created daily, and the present ones would run the risk of being damaged by infiltrations and sappings. Also they would lose in reputation, as the same care would not be taken in every case to have the work efficiently executed, and discredit would fall indifferently upon all the springs.

For this monopoly the State granted a lease to the Compagnie Fermière in 1853 of these springs for a term of thirty-three years, for which the Company has to pay a royalty of one hundred thousand francs per annum, and also one sou for each bottle of water exported, this latter sum going to the hospital.

A fresh agreement was entered into in the year 1864, by which the lease was extended for a further term of eighteen years, making a lease of fifty-one years in all. Under this new agreement the Company had fresh obligations laid upon it, notably the construction of the Casino, and the payment quarterly of a sum of fifty-five thousand francs to the Treasury. This sum is destined for the larger repairs of the Thermal Establishment, for keeping the thermal roads in a proper state of repair, for the expenses in

connection with the New Park, the river that runs by its side, and the hot-houses.

At the expiration of the lease all these buildings and establishments, representing some millions of francs, will revert to the State.

We will now describe each spring individually.

CHAPTER III.

THE THERMAL SPRINGS OF VICHY CONSIDERED
INDIVIDUALLY.

GRANDE GRILLE.

A NATURAL spring situated at the north-east angle of the north gallery of the bathing establishment, taking its name from a large iron railing which formerly surrounded it, but which has long since disappeared.

This spring is used both for drinking and bath purposes. To approach the *buvette*, which is enclosed by an iron railing, it is necessary to descend a couple of steps. The water flows into a large circular basin, spurting up about half a yard, and causing a peculiar noise which can be heard for some distance.

This is one of the warmest springs that Vichy possesses, its temperature being 42° C. Only two other springs are hotter, the Puits Carré with a temperature of 45° C., and the Puits Chomel with 44° C.

The present output of the spring is close upon 100,000 litres in the twenty-four hours, which amply supplies both *buvette* and baths.

The output was not always so considerable ; in 1859 it amounted only to about 3500 litres. At this time the Government commissioned M. François, engineer, to undertake certain works with the object of confining the waters of this spring. The result of these works was most satisfactory ; a freer issue for the waters was obtained, and the outflow enormously increased. At the same time, as the quantity given out became greater, the temperature of the water increased. From 38.5° C., before the commencement of these works, it rose to its present temperature, 42° C.

This effect was only natural, and is easy to explain ; it has been remarked on many similar occasions, for the more rapid the flow the less time has the water to cool.

At Vichy the natural springs, which are the most abundant, are the warmest, or, putting it the other way, those which are the warmest are the most abundant.

During the night-time the supply to the *buvette* is cut off. There are two systems of conduits, one for the *buvette* and another which opens at a level of four yards below the first. The *buvette* conduit being closed at night, the output of the second becomes very much more considerable. This latter supply is used exclusively for bottling, exportation, and bath purposes, the water for the bath being pumped up into the bathing establishment as required.

The composition of the water of the Grande Grille may be considered typical of the Vichy mineral waters

in general. Every quart contains 4·883 gr. of soda bicarbonate and about 3 per cent. of other saline components.

The exact analysis of the spring is as follows:

Proportions of the various saline components, hypothetically attributed to one quart of the Grande Grille Spring (M. Bouquet).

Carbonic acid, free	0·908
Bicarbonate of soda	4·883
" potash	0·352
" magnesia	0·303
" strontia	0·303
" lime	0·434
" protoxide of iron	0·004
" protoxide of manganese	traces
Sulphate of soda	0·291
Phosphate of soda	0·130
Arseniate of soda	0·002
Borate of soda	trace
Chloride of sodium	0·534
Silicium	0·070
Organic bituminous matters	traces
Total	7·914

Proportions of the various principles contained in each quart (M. Bouquet).

Carbonic acid	4·418
Sulphuric acid	0·164
Phosphoric acid	0·070
Arsenic acid	0·001
Boric acid	traces



longing to the State and to private individuals.

vaisse.	Puits d'Haute- rive.	Mes- dames.	l'Abattoir.	Sainte- Marie.	Elisabeth.	St.-Yorre.	Prunelle.	Malat.	Guerrier.
68	2·183	1·908	1·405	1·642	1·770	1·549	0·945	2·008	1·420
37	4·687	4·016	5·130	4·753	4·837	4·838	5·295	4·660	4·910
22	0·189	0·189	0·274	0·262	0·253	0·337	0·121	0·380	0·415
32	0·501	0·425	0·532	0·463	0·460	0·274	0·079	0·060	0·215
05	0·003	0·003	0·005	0·003	0·003	0·007	—	0·060	traces
01	0·432	0·604	0·725	0·692	0·707	0·683	0·532	0·640	0·740
04	0·017	0·026	0·040	0·003	0·022	0·010	0·024	0·012	0·035
es	traces	traces	traces	traces	traces	traces	—	0·012	traces
3	0·291	0·250	0·291	0·340	0·340	0·280	0·278	0·024	0·240
2	0·046	traces	traces	traces	traces	traces	—	0·024	traces
2	0·002	0·003	0·003	0·003	0·003	0·002	—	0·010	0·002
es	traces	traces	traces	traces	traces	traces	—	0·010	0·002
8	0·534	0·355	0·534	0·453	0·468	0·555	0·561	0·510	0·414
1	0·071	0·032	0·032	0·025	0·034	0·035	—	0·010	0·040
es	traces	traces	traces	traces	traces	traces	0·030	0·010	traces
5	8·956	7·811	8·971	8·669	8·897	8·570	7·841	8·314	8·439
	13°	16°	—	16°	16°	10°	23°	12°	13°



Chlorhydric acid	0·334
Silex	0·070
Protoxide of iron	0·002
" manganese	traces
Lime	0·169
Strontia	0·002
Magnesia	0·097
Potash	0·182
Soda	2·488
Bituminous matters	traces
 Total	 7·997

This water, like that of most of the Vichy springs, is decidedly insipid to the taste, and some patients have a certain difficulty in accustoming themselves to it for the first one or two days, but the stomach soon becomes more tolerant.

We would remark here, that the patient would do well to keep to the quantity prescribed, for patients have a tendency to go much beyond what is ordered them, thinking thereby to hasten their cure ; fatal mistake, instead of hastening they delay it, for it frequently becomes necessary in these cases to stop the treatment altogether for some days, until the baneful effects of this excess have disappeared, and the system is once more in a fit condition to profit by a judicious use of these waters. The patient must remember that the water drunk at the wells is quite a different thing from the water exported, for while this last, bottled with every care, is a most useful drink in many cases when it cannot otherwise be procured, it

has lost many of its properties, and notably a large quantity of its gases. The very fact of the springs being warm renders this unavoidable, so while one may drink large quantities of the bottled waters with little injury, it is not the same with that drunk at the wells, where the water has all its active principles, and therefore acts much more powerfully.

The Grande Grille is specially recommended for complaints of the liver, biliary calculi, congestion of the spleen, complaints of the intestinal tract, gravel, &c. But as all the waters of Vichy are approximately the same in their composition, differing chiefly in their temperature, it may appear curious that some should be more beneficial in certain cases than others. This difference depends in reality on the susceptibility of the patient. With some the stomach cannot tolerate such and such a spring, which with another will work a speedy cure for the same complaint. It thus happens that patients if left to themselves would frequently increase their malady instead of relieving it; and it also follows that there is no hard-and-fast rule to indicate a particular spring for a particular disease.

Generally speaking, one commences by taking small quantities, 50 grammes, but the doctor alone can fix the quantity after having examined the patient.

This water, like many other of the Vichy waters, is liable to cause constipation, and if the quantity absorbed be too great, violent headache and general nervous symptoms may supervene.

The Grande Grille presents a crowded and curious aspect at the drinking hours. It is the most frequented of all the springs, and as those with liver complaint flock in large numbers to this well, every tint of yellow will be seen there at these hours.

(For the English equivalents of Centigrade see table.)

PUITS CARRÉ.

This spring is situated underground, at what would be about the middle of the northern gallery. Temperature 45° C. It is a natural spring.

It had formerly a buvette attached to it, and was prescribed for thin and nervous people. It was used by the monks until towards the close of the eighteenth century, and at that time went by the name of the "Fontaine des Capucins." The buvette disappeared about this time, and ever since the waters have been exclusively used for the bath service. It is the most abundant spring that Vichy possesses, yielding 250,000 litres a day.

We give the analysis, but, as it is no longer employed for drinking, it offers only a secondary interest.

Quantity of the various saline components hypothetically attributed to one quart of the Puits Carré water (M. Bouquet).

Free carbonic acid	0·876
Bicarbonate of soda	4·893
" potash	0·378
" magnesia	0·335
" strontia	0·003
" lime	0·421
" protoxide of iron	0·004
" protoxide of manganese	traces
Sulphate of soda	0·291
Phosphate of soda	0·028
Arseniate of soda	0·002
Borate of soda	traces
Chloride of sodium	0·534
Silicium	0·068
Organic bituminous matters	traces
Total	7 833

Proportions of the various principles contained in one quart of the Puits Carré (M. Bouquet).

Carbonic acid	4·418
Sulphuric acid	0·164
Phosphoric acid	0·015
Arsenic acid	0·001
Boric acid	traces
Chlorhydric acid	0·334
Silex	0·068
Protoxide of iron	0·002
" manganese	traces
Lime	0·164
Strontia	0·002

Magnesia . . . . .	. 0·107
Potash . . . . .	. 0·196
Soda . . . . .	. 2·445
Bituminous matters . . . . .	. traces
Total	<hr/> 7·916

This spring and the Puits Chomel are the two warmest in Vichy, their composition being almost identical.

PUITS CHOMEL.

A natural spring situated in the centre of the north gallery, only a yard or two distant from the spot where the Puit Carré rises. The buvette is in front of the office where the bath tickets are obtained.

It derived its name from that of a celebrated physician, Dr. Chomel, ancient Dean of the Faculty of Paris, Physician in Ordinary to the King, and Intendant of the waters, who was the first to employ the spring, but who was not, it would appear, its real discoverer.

Being at Vichy in 1775, while the construction of the Thermal Establishment was being proceeded with, one of the workmen in removing a stone gave exit to the spring, which the doctor immediately baptized after himself.

This spring is also called the “Petit Puits Carré,” and in the eighteenth century it went by the name of “La Petite Grille.”

Its temperature is 44° C., the output but 2600

litres in the twenty-four hours. For some time past the waters of the Puits Chomel and Puits Carré have been united, so that at present these two springs form but one. The water is conveyed to the buvette by means of a pump, and served into the glasses from a tap.

The water has a most disagreeable smell of sulphuretted hydrogen, and the taste is almost as bad as the smell. It sometimes causes nausea from this cause, and for those persons to whom it is prescribed and who have difficulty in swallowing it, we would recommend letting the water stand for a few minutes in the glass before swallowing it, so as to allow some of this gas to escape. Many people prefer to mix tea, milk, or syrup with it, but this is simply a matter of taste.

This water is the richest of all the springs in mineral principles, and at the same time the least charged with free carbonic acid.

It is specially recommended for all complaints of the respiratory organs. Being the least exciting of all the springs it is well suited for very nervous and delicate persons. It is frequently prescribed for women and children and when the stomach is wanting in tone.

Many of the Vichy physicians resist its being held forth as a "specific" for these complaints, and we think with reason. It does good in many cases, but it has to be prescribed according to the constitution of the patient, and will not agree with everyone. In

many cases other springs would be as beneficial, if not better, for this same category of complaints, and the physician alone is capable of judging where its use would be judicious or baneful.

It is largely employed for gargling purposes. Formerly the gargling was performed in public much to the amusement of the onlookers ; but the Thermal Establishment, by having private rooms constructed for this purpose, have now done away with this gratuitous entertainment.

The analysis is almost identical with that of the Puits Carré.

Quantities of the various saline components, hypothetically attributed to one quart of the spring (M. Bouquet).

Free carbonic acid	0·768
Bicarbonate of soda	5·091
" potash	0·371
" magnesia	0·338
" strontia	0·003
" lime	0·427
" protoxide of iron	0·004
" protoxide of manganese	traces
Sulphate of soda	0·291
Phosphate of soda	0·070
Arseniate of soda	0·002
Borate of soda	traces
Chloride of sodium	0·534
Silicium	0·070
Organic bituminous matters	traces
Total	<hr/> 7·959

Proportions of the various principles contained in one quart (M. Bouquet).

Carbonic acid	4·429
Sulphuric acid	0·164
Phosphoric acid	0·038
Arsenic acid	0·001
Boric acid	traces
Chlorhydric acid	0·334
Silex	0·070
Protoxide of iron	0·002
,, manganese	traces
Lime	0·166
Strontia	0·002
Magnesia	0·108
Potash	0·192
Soda	2·536
Bituminous matters	traces
Total	8·012

SOURCE DE L'HÔPITAL OR SOURCE ROSALIE.

Indifferently indicated by either of these names, it acquired the first by reason of its situation in front of the civil hospital, and the second from the Duchess of Mouchy, who had the then existing dirty and untidy approaches to the spring done away with, and gave orders to have its surroundings put into a clean and proper state of repair. It also went by the name of the "Gros Boulet" for some time.

This natural spring is situated in the centre of the Place Rosalie, in front, as we have said, of the civil hospital. It springs up in the centre of a large

stone basin, surrounded by iron railings, and is protected by a wrought iron pavilion which, while affording shelter from above, does not prevent the water from being contaminated by the dust which the wind blows into the fountain through the iron railings, and from losing some of its gases, which the wind also carries off. These inconveniences could easily be remedied, at a very trifling outlay, and if the authorities would give the necessary orders to have it done they would be rendering a great service to the drinkers.

To approach the buvette, four circular steps have to be ascended.

The temperature of this spring is 31° Centigrade. The yield per twenty-four hours is 60,000 litres. It not only supplies the buvette but also the bathing establishment situated in front of it.

When drinking the water a decided taste of sulphuretted hydrogen is at once perceived. This spring is analogous in many respects to that of the Grande Grille, but it is richer in organic matter, and one is at once struck, when approaching the buvette, by the peculiar green deposit round the sides of the basin which, according to M. Jourdan, is exclusively formed by an algus called the *Protoderma thermale*. It is the same as that frequently observed in certain other thermal springs rich in organic matter, and which contributes to make the water soft and unctuous.

This spring ranks as being one of the least exciting, and is therefore specially suited to nervous patients,

but it is not digested by everyone with the same facility, and frequently occasions diarrhoea. This depends sometimes on the patient absorbing too large a quantity, and also frequently by a special condition of the stomach.

It is prescribed in numerous diseases of the digestive organs, dysentery, dyspepsia, gastralgia, and also for obstinate diarrhoea ; but from the fact that this water is very active it is generally necessary to take but very small quantities of it, and for the physician to watch closely its effects upon the patient.

It has been found very useful for patients who by too arduous head work have overtaxed the brain power ; thus many literary men may be met at this spring.

For many female complaints, such as congestion, catarrh, and other complaints of the uterus it may be employed with much advantage, and lastly, for those of both sexes whose constitution has become enfeebled by excesses it has proved most useful.

The analysis is as follows :

Proportions of the various saline components hypothetically attributed to one quart of this spring (M. Bouquet).

Free carbonic acid	.	.	.	.	1·067
Bicarbonate of soda	.	.	.	.	5·029
„ potash	.	.	.	.	0·440
„ magnesia	.	.	.	.	0·200
„ strontia	.	.	.	.	0·005
„ lime	.	.	.	.	0·570

THE THERMAL SPRINGS CONSIDERED INDIVIDUALLY. 35

Bicarbonate of protoxide of iron	0·004
, , protoxide of manganese	traces
Sulphate of soda	0·291
Phosphate of soda	0·046
Arseniate of soda	0·002
Borate of soda	traces
Chloride of sodium	0·518
Silicium	0·050
Organic bituminous matters	traces
 Total	 8·222

Proportions of the various principles contained in one quart (M. Bouquet).

Carbonic acid	4·719
Sulphuric acid	0·164
Phosphoric acid	0·025
Arsenic acid	0·001
Boric acid	traces
Chlorhydric acid	0·324
Silex	0·050
Protoxide of iron	0·002
, manganese	traces
Lime	0·222
Strontia	0·003
Magnesia	0·064
Potash	0·228
Soda	2·500
Bituminous matters	traces
 Total	 8·302

SOURCE LUCAS.

So named from one of the ancient directors of the Vichy waters.

A natural spring situated in the rue Lucas, between the Military Hospital and the Eden Theatre.

The buvette is of a somewhat humble construction and but very little frequented. Temperature 29° C.; daily output 148,000 litres.

This water has a decidedly pronounced taste of sulphurous gas, but not so strong as to render it undrinkable. It was formerly employed pretty freely in affections of the skin, and more particularly for the itch. At the present time patients appear to have taken a great dislike to this spring, probably from what tradition has handed down about the class of patients who used formerly to frequent it. It has no special indication, but from its medium temperature might be found useful in many cases where the warmer or cooler springs are not easily digested.

It supplies the Military Hospital, which is in front of it, and the surplus water serves to feed the baths of the Thermal Establishment. This spring is now joined to that of the Acacias. Analysis :

Various saline compounds hypothetically attributed to one quart of this spring (M. Bouquet).

Free carbonic acid	.	.	.	.	1·751
Bicarbonate of soda	.	.	.	.	5·004
„ potash	.	.	.	.	0·282
„ magnesia	.	.	.	.	0·275
„ strontia	.	.	.	.	0·005
„ lime	.	.	.	.	0·545
„ protoxide of iron	.	.	.	.	0·004
„ protoxide of manganese	.	.	.	.	traces

Sulphate of soda	0·291
Phosphate of soda	0·070
Arseniate of soda	0·002
Borate of soda	traces
Chloride of sodium	0·518
Silicium	0·050
Organic bituminous matters	traces
Total	<hr/> 8·797

Proportions of the various principles contained in one quart (M. Bouquet).

Carbonic acid	5·348
Sulphuric acid	0·164
Phosphoric acid	0·038
Arsenic acid	0·001
Boric acid	traces
Chlorhydric acid	0·324
Silex	0·050
Protoxide of iron	0·002
,, manganese	traces
Lime	0·212
Strontia	0·003
Magnesia	0·088
Potash	0·146
Soda	2·501
Bituminous matters	traces
Total	<hr/> 8·877

SOURCE DES CELESTINS.

The Celestins Springs are three in number :

1. La Vieille Source (the Old Spring).
2. Source de la Grotte (Spring of the Grotto).

3. La Nouvelle Source (the New Spring).

These are all natural springs and rise in the Parc des Celestins, taking their collective name from a convent of the Moines Celestins, which existed formerly in this place, and of which certain ruins are still to be seen.

All these springs rise from a rock, an enormous mass of arragonite, which has been slowly formed by successive deposits from these waters. Their waters are received into a kind of huge reservoir cut out of the stone. By means of a pump they are afterwards brought to the surface.

This is one of the most frequented springs of the town, and also one of the most exciting.

The Old Spring and the Spring of the Grotto have an exceedingly small output in comparison to that of the New Spring; the first produces only about 150 litres per day, the second about twice as much. They alone would therefore be quite inadequate to the demand; but, fortunately, the New Spring is there, whose yield is considerable, and as this last closely resembles the two preceding in composition and temperature, as well as by its therapeutic effects, it will suffice for us to describe the New Spring.

The New Spring was discovered in 1870; it is a natural one, and is what is termed a cold spring. It rises from the same rock as the two preceding ones, its temperature is 13° C., and the daily yield about 22,000 litres.

This water has been and is still considered by many

persons as being one of the richest in carbonic acid that Vichy possesses. This is altogether a mistake, as the analysis conclusively proves ; the Source Lucas, to give a single example, has 5·348 per litre, whereas the New Spring has but 4·705 per litre. In reality it occupies about the middle place, by its richness in carbonic gas, as compared with the other Vichy waters, and what has probably led to this error is that the spring, being a cold one, the gas is more easily perceived by the drinkers.

It is easily digested, most refreshing and agreeable to the palate, and recommended in cases of uric gravel, nephritic colics, gout, diabetes and albuminuria. It possesses exciting and energetic properties to a high degree, and a word of caution to invalids using this spring may perhaps not be amiss. The water being so palatable, patients have a great tendency, more particularly in summer, to drink it almost *ad libitum*. Frequently no immediate danger follows this imprudence, but the after-consequences are often deplorable, for this, of all the Vichy springs, is one in which moderation, temperance, and strict attention to the doctor's orders ought to be observed. Taken in excess, it sometimes produces at once congestion of the head, cephalalgia, giddiness, and impaired sight.

All the Vichy medical men concur in thinking it is a great advantage to the patient that this spring is situated at some little distance from the town, as it thus affords them the means of taking a most salutary walk. We would here remark that the Celestins

Park, so prettily and tastefully laid out, has a decided influence upon the cure, for the scenery soothes and calms the patient, the digestion is facilitated, and the whole benefit of the water obtained.

Considerable trouble and much expense have been incurred to render this spot at once agreeable and comfortable for invalids. To protect them against the rain a sheltered gallery has been constructed; a billiard-room and other amusements are also to be found here. Fine trees, beautiful beds of flowers and winding alleys complete the decoration and make it a fairy scene. The situation of the place, garden and avenue are equally delightful and entertaining.

The analysis of the Celestins Spring is as follows:

Proportions of the various principles contained in one quart of this spring (M. Bouquet).

Carbonic acid	.	.	.	.	.	4·705
Sulphuric acid	.	.	.	.	.	0·164
Phosphoric acid	.	.	.	.	.	0·050
Arsenic acid	.	.	.	.	.	0·001
Boric acid	.	.	.	.	.	traces
Chlorhydric acid	.	.	.	.	.	0·334
Silex	.	.	.	.	.	0·060
Protoxide of iron	.	.	.	.	.	0·002
,, manganese	.	.	.	.	.	traces
Lime	.	.	.	.	.	0·180
Strontia	.	.	.	.	.	0·003
Magnesia	.	.	.	.	.	0·105
Potash	.	.	.	.	.	0·163
Soda	.	.	.	.	.	2·560
Bituminous matters	.	.	.	.	.	traces
Total	.	.	.	.	.	8·327

The various saline components hypothetically attributed to each quart of this water (M. Bouquet).

Free carbonic acid	1·049
Bicarbonate of soda	5·103
,, potash	0·315
,, magnesia	0·328
,, strontia	0·005
,, lime	0·462
,, protoxide of iron	0·004
,, protoxide of manganese	traces
Sulphate of soda	0·291
Phosphate of soda	0·091
Arseniate of soda	0·002
Borate of soda	traces
Chloride of sodium	0·534
Silicium	0·060
Organic bituminous matters	traces
Total	<hr/> 8·244

SOURCE DU PARC.

Situated in the Old Park, midway between the Casino and the Bathing Establishment, in front of the rue Prunelle.

It was discovered in 1844 by the brothers Brosson by means of a boring carried down to a depth of about 48 metres. When this artesian well was first bored, the yield of the Puits Carré considerably diminished, and fears were entertained that this spring was being sapped. When later on, however, certain works were executed in the Puits Carré—the

mouth of the spring lowered, and the concrete substance which obstructed it removed—the flow from the Source du Parc lessened while that of the Puits Carré increased. In 1853 the Source du Parc was purchased for the State by the Thermal Company.

The flow is somewhat intermittent, the mean output being about 48,000 litres in the twenty-four hours; the temperature 22° C.

The buvette is placed in the centre of an elegant kiosk, but is little frequented, these waters being principally used for bathing purposes and for exportation.

The water has a slight sulphurous taste; it is cooler and less active than that of the Celestins, and can often replace it with advantage when the former is not easily digested.

It is recommended in gravel, cystitis, for persons affected with a sluggish action of the digestive organs, and for different affections of the skin. It is also prescribed for certain disorders of the respiratory organs such as chronic irritation or catarrh.

The analysis is as follows :

Various saline components hypothetically attributed to one quart of this spring (M. Bouquet).

Free carbonic acid	.	.	.	1.555
Bicarbonate of soda	.	.	.	4.857
” potash	.	.	.	0.292
” magnesia	.	.	.	0.213
” strontia	.	.	.	0.005

THE THERMAL SPRINGS CONSIDERED INDIVIDUALLY. 43

Bicarbonate of lime	0·614
, protoxide of iron	0·004
, protoxide of manganese	traces
Sulphate of soda	0·314
Phosphate of soda	0·140
Arseniate of soda	0·002
Borate of soda	traces
Chloride of sodium	0·550
Silicium	0·055
Organic bituminous matters	traces
Total	<hr/> 8·601

Proportions of the various principles contained in one quart (M. Bouquet).

Carbonic acid	5·071
Sulphuric acid	0·177
Phosphoric acid	0·076
Arsenic acid	0·001
Boric acid	traces
Chlorhydric acid	0·344
Silex	0·055
Protoxide of iron	0·002
, manganese	traces
Lime	0·239
Strontia	0·003
Magnesia	0·068
Potash	0·151
Soda	2·500
Bituminous matters	traces
Total	<hr/> 8·687

SOURCES MESDAMES.

This spring is situated on the road to Cusset, at about $1\frac{1}{2}$ kilometres from Vichy, on the banks of the Sichon. It rises in the Alley des Mesdames, and has acquired its present name in remembrance of the stay that Mesdames Adelaide and Victoire de France made at Vichy. M. Brosson undertook the boring of this well a short time after the discovery of the Lardy spring, which it resembles in many respects. It formerly belonged to M. Pajot, but has since been acquired by the State. By means of pipes the water is conveyed to the First-class Thermal Establishment, and the buvette of this spring is placed in the north-east extremity of the gallery.

It furnishes 20,000 litres in the twenty-four hours; and has a temperature of 16° C.

Very rich in iron and carbonic acid, it closely approaches the Lardy Spring in composition. The quantity of its chalybeate principles is considerable, and it is one of the richest in arsenical salts. Drunk at its source it is cooler than when taken at the Thermal Establishment, as it becomes heated in passing through the pipes. It is also probable that it loses some of its elements in this transit, for although every care is taken to prevent their escape, the fact remains that the conduit pipes become covered with a deposit which is undeniably a portion of the constituents which are precipitated by the way.

This spring is renowned for its curative principles in cases of anaemia, chlorosis or green sickness, adynamia, general depression, and for lymphatic people. It is most beneficial for women affected with leucorrhœa (whites), and is generally well suited to nervous individuals.

But as some of these disorders have widely different origins it will not suit all cases; on the contrary, it may do much injury. To give but one example, a consumptive patient, taking this water for anaemia, would only hasten the course of his malady, which from the latent state would pass into what is termed galloping consumption.

By some persons it is very indifferently supported, and by all should be taken with discretion. The large quantity of iron which it contains acts energetically upon the circulation, increasing the number of red blood-corpuscles (haematosis). It follows that if taken in too large quantities it produces congestion, haemorrhage, and vascular plethora.

It is less stimulating than the Lardy Spring, but it appears to be more indigestible, as many patients who cannot support the Mesdames Spring have no difficulty in digesting the Lardy waters. In those with whom it thus disagrees it causes a heavy feeling in the stomach and produces flatulency, colic, and diarrhoea.

We append the analysis :

THE MINERAL WATERS OF VICHY.

Various saline components hypothetically attributed to one quart (M. Bouquet).

Free carbonic acid	1·908
Bicarbonate of soda	4 016
,, potash	0·189
,, magnesia	0·425
,, strontia	0·003
,, lime	0·604
,, protoxide of iron	0·026
,, protoxide of manganese	traces
Sulphate of soda	0·253
Phosphate of soda	traces
Arseniate of soda	0·003
Borate of soda	traces
Chloride of sodium	0·355
Silicium	0·032
Organic bituminous matters	traces
 Total	 7·811

Proportions of the various principles contained in one quart of this spring (M. Bouquet).

Carbonic acid	5·029
Sulphuric acid	0·141
Phosphoric acid	traces
Arsenic acid	0·002
Boric acid	traces
Chlorhydric acid	0·002
Silex	0·032
Protoxide of iron	0·012
,, manganese	traces
Lime	0·235
Strontia	0·002

Magnesia	0·136
Potash	0·098
Soda	1·957
Bituminous matters	traces
Total	<hr/> 7·866

SOURCE DE HAUTERIVE.

This spring is distant about $5\frac{1}{2}$ kilometres from Vichy. It rises in a large and beautiful park of the same name. In 1844 MM. Brosson caused borings to be made on the same site as that on which two springs had previously existed, but had long since ceased flowing. After attaining a depth of fifty yards they struck the source, which furnishes daily some 30,000 litres, at a temperature of 13° C. In 1853 it was bought for the State by the Thermal Company.

It takes the third rank in chalybeate springs, and is by far the most important of the three in consequence of its enormous exportation. Formerly two springs existed, but now they have been united.

It is exceedingly rich in carbonic acid, and, being a cold spring, is eminently suited for exportation. The integrity of the waters thus exported is chiefly due to the presence of an excess of carbonic acid, which keeps the whole of the properties in solution. It is not rare to perceive small black specks in the bottled water ; this is simply some of the deposits in suspension, and in no wise deteriorates the water.

Although chiefly used for export purposes, there is a buvette established at the side of the bottling establishment, where visitors can taste the water. Exceptionally a fee of fifteen centimes is charged per glass, and twenty-five centimes should one desire to fill a bottle to take away. It is an agreeable promenade to Hauterive, and it is rather for this reason than for the waters that visitors go there.

As this water is generally drunk away from the source, its therapeutic indications are not so well established as those of some of the other springs.

For home consumption it is taken in diseases of the kidneys and bladder, for gout, gravel, urinary calculi, diabetes, and obesity. Very similar in its composition to that of the Celestins Springs, it has in general the same indications. Analysis :

Various saline components hypothetically attributed to one quart (M. Bouquet).

Free carbonic acid	2·183
Bicarbonate of soda	4·687
" potash	0·189
" magnesia	0·501
" strontia	0·003
" lime	0·132
" protoxide of iron	0·017
" protoxide of manganese	traces
Sulphate of soda	0·291
Phosphate of soda	0·046
Arseniate of soda	0·002
Borate of soda	traces

THE THERMAL SPRINGS CONSIDERED INDIVIDUALLY. 49

Chloride of sodium	0·534
Silicium	0·071
Organic bituminous matters	traces
Total	<u>8·956</u>

Proportions of the various principles contained in one quart (M. Bouquet).

Carbonic acid	5·640
Sulphuric acid	0·163
Phosphoric acid	0·002
Arsenic acid	0·001
Boric acid	traces
Chlorhydric acid	0·334
Silex	0·071
Protoxide of iron	0·008
,, manganese	traces
Lime	0·168
Strontia	0·002
Magnesia	0·160
Potash	0·098
Soda	2·368
Bituminous matters	traces
Total	<u>9·039</u>

PRIVATE SPRINGS.

Having described the springs belonging to the State, we will now speak of the principal private springs, most of which are at some distance from the town. These are twelve in number.

Source Lardy,	Source St. Jean,
Source Prunelle,	Source Mallat,
Source Ste. Marie,	Source Larbaud ainé,
Source Elisabeth,	Source Larbaud-St. Yorre,
Source Dubois,	Source Guerrier,
Source Tracy,	Source Forissier.

SOURCE LARDY.

The Lardy well is situated on the right bank of the Allier at the junction of the Boulevard des Celestins and Boulevard National, on the site of the old convent des Celestins. It is the property of the Compagnie des Eaux Minérales et Bains de Mer. It is the deepest of the Vichy artesian wells, the boring extending to a depth of 250 metres below the surface. The actual daily flow is somewhere about 8000 litres, though formerly it gave out 20,000 litres in the same time. Temperature 24° C.

These waters supply both the bathing establishment situated in the Park, and which we have already described when speaking about the Lardy Park, and the buvette.

The buvette is placed in the centre of a rustic pavilion ; it is very much frequented, not only by those who are ordered these waters, but also by a number of individuals who frequent the Park because it is *à la mode*. In the afternoon, more particularly, it presents a most animated aspect.

The water has a decided taste of iron, and both the olfactory and gustatory organs have no difficulty in detecting the presence of sulphuretted hydrogen. It possesses also a notable quantity of arsenic. It has a tendency to blacken the teeth, and for this reason we would recommend patients who are particular on this point to sip the water through a glass tube.

It acts energetically upon the stomach and is easily digested ; but it has a tendency to produce cephalalgia and must be taken in small quantities.

By its iron and arsenic it is most stimulative, causes increased activity of the circulation and augments the number of red blood-corpuscles. It is thus admirably suited to cases of chlorosis, and great numbers of young girls and women derive much benefit from its use for this complaint. It is generally useful in all cases where the system is low and unhealthy from a poor condition of the blood. In cases of amenorrhœa and debility following a great loss of blood it has been proved of sovereign benefit. It is said to

have wonderfully salutary effects in cases of paludal cachexia, when taken in combination with the Grande Grille. It is natural that this should be the case from its twofold strengthening action, but we have not had occasion, so far, to try these two waters in combination for this malady.

The analysis of this well has not always given the same result. The analysis of O. Henry in 1845, of M. Lefort in 1849, and of the École des Mines in 1852, differ in many details, but these differences are easy to understand and are thus explained by the ‘Journal de Pharmacie et de Chimie,’ T. xvi : (translation.)

“ To admit of a complete uniformity in the composition of a mineral water, is to suppose an unchangeable uniformity in the composition of the strata, in the volume of the spring, and lastly an inexhaustible abundance of these salts in the lower layers of the soil. Up to the present time, if science has not been permitted to penetrate into these immense laboratories, and to see how all these products are formed, which for centuries past are deposited in the soil, it is nevertheless proved that these waters become mineralised in the bosom of the earth by means of a high pressure, a high temperature, and electricity. Under the influence of terrestrial revolutions some of these conditions may change, and on this hypothesis it is easy to understand the varying composition of the waters.”

Subjoined is the latest analysis, made in 1854 by M. Bouquet :

Proportions of the various principles contained in one quart of Puits Lardy.

Carbonic acid	5·499
Sulphuric acid	0·177
Phosphoric acid	0·044
Arsenic acid	0·002
Boric acid	traces
Chlorhydric acid	0·334
Silex	0·065
Protioxide of iron	0·013
" manganese	traces
Lime	0·276
Strontia	0·003
Magnesia	0·076
Potash	0·273
Soda	2·486
Bituminous matters	traces
 Total	 9·428

SOURCE LARBAUD AINÉ.

It rises on the road to Nîmes at the foot of the Côte St. Amand, and its waters are conveyed by means of pipes to a thermal establishment situated on the Boulevard des Celestins. It is employed both for the baths and for exportation.

The yield is estimated at 20,000 litres per twenty-four hours. Temperature 15° C.

A buvette is attached to the establishment. Its indications are similar to those of the Hauterive

and St. Yorre springs—chlorosis, gravel, dyspepsia, &c.

It belongs to the group of ferruginous springs, and its most important principles are—Bicarbonate of soda 4·880 ; protoxide of iron 0·023 ; carbonic acid 1·320 gr. per litre.

SPRINGS AT CUSSET.

There are four springs at Cusset, viz. Ste. Marie, Elisabeth, Tracy, St. Jean. The two first belong to the Établissement Thermal de Ste. Marie.

SOURCE STE. MARIE AND SOURCE ELISABETH.

These two springs are both remarkable for their richness in mineral properties. They are situated close to one another. The first dates from 1849, and the borings for the second were made in 1844. They both supply the Thermal Establishment in which they are situated for the bath service and for the buvettes. When speaking of Cusset in another part of this volume we have occasion to describe this bathing establishment and also its baths, douches, piscine, &c., under which heading we refer the reader for more ample details.

The Source Elisabeth is the richest in bicarbonate

of soda, having 5.843 gr. per litre, and the amount of magnesia it contains is four or five times greater than that of the Grande Grille, l'Hôpital and the Celestins, viz. 0.330 gr. per litre.

Its applications are numerous: congestion of the liver and spleen, gout, gravel, &c. One of the qualities vaunted for this water is that it has no tendency to constipate.

The Ste. Marie is the richest mineral alkaline spring known. It contains 330 milligrammes of iron and manganese per litre. It is also one of the richest in free carbonic acid, having as much as 0.610 gr. per litre. The presence in it also of lithia gives it a certain superiority over some of the other waters in the treatment of gout.

It is prescribed in cases of anaemia, chlorosis, intermittent fevers, diabetes, gravel, and gout.

The temperature of both these springs is 16° C.

These waters lose a minimum of their properties by exportation, and rank as being the best adapted for this purpose.

The Thermal Establishment at Cusset extracts the natural salts from these waters and manufactures its own pastilles &c., in the same manner as at the Thermal Establishment at Vichy.

We give the analysis of these two springs together:

For one litre.

		<i>Ste. Marie.</i>		<i>Elisabeth.</i>
Nitrogen . .	.	inappr. ...		inappr.
Free carbonic acid . .	.	0·6100 lit. ...		0·280 lit.
Bicarbonates, anhyd.	of soda .	4·2000 gr. ...		5·2000 gr.
	of potash .	0·0050		indications
	of lime .	0·4360 ...		0·6510
	of magnesia .	0·1200 ...		0·3300
	of strontia .	traces ...		traces
Sulph. anhyd. of soda . .	.	0·4000 ...		0·5020
" " of potash . .	.	— ...		0·0100
Chlor. of soda . .	.	0·5010 ...		{ 0·4600
" " of potash . .	.	0·5010 ...		{ 0·0200
Iodide }				
Bromide } alkaline . .	.	f. sens. ...		sensibl.
Silicate of soda . .	.	0·1400 ...		0·1500
Protox. of iron and manganese . .		0·0229 ...		0·0090
Lithine, phosph., alumin, arsenic, and organic matter . .		0·0210 ...		0·1500
Fixed substances . .		5·8459 ...		7·5720
Arsenic . .		0·0002 ...		0·0002

SOURCE TRACY.

Situated in the Cours Tracy, near the Hôtel de Ville.

It is only used for the buvette, which is placed some fifteen steps below the level of the road. The temperature is 12° C.

Rich in carbonic acid, it is agreeable to the taste, and well suited as an ordinary drinking water.

It has no special indications.

The analysis is as follows (M. O. Henry).

For one litre.

Free carbonic acid	1·048
Bicarbonate of soda (anhydrous)	5·120
" lime	0·380
" magnesia	0·220
" lithine and iron	traces
" potash	traces
Sulphate of soda (anhydrous)	0·903
" lime	0·021
Chloride of sodium	0·380
" potassium	0·020
Bromide of sodium	} considerable
Iodide	
Silicate and alkalin nitrates	indications

SOURCE ST. JEAN.

Springs up in the middle of the old slaughter-house.
Temperature 12·5° C. Resembles closely the preceding, but has a stronger taste of iron.

It is not much employed, and, like the Source Tracy, has, as yet, no particular indications. In many respects it resembles the Hauterive Spring, and would probably be found as useful as Hauterive in the class of disorders for which that spring is prescribed.

Analysis of one litre.

Free carbonic acid	0·640
Bicarbonate of soda (anhydrous)	2·633
" lime	0·158

Bicarbonate of magnesia	0·045
, strontia	traces
, lithine	traces
, iron and manganese	0·003
Sulphate of iron (anhydrous)	2·330
, potash	0·020
, lime	decided traces
Chloride of sodium	0·354
, potassium	0·011
Silicate of soda	0·130
Silex and alumine	0·060

SOURCE DUBOIS.

This spring being placed within the protected radius, and having been discovered after the law had been passed preventing anyone from working any new spring within the radius, has for the present but little interest. It is situated upon the road to Nîmes, near the Lardy Spring.

It has been analysed, and the following are the results :

Free carbonic acid	0·953
Bicarbonate of soda	3·330
, potash	0·235
, magnesia	0·155
, strontia	0·009
, lime	0·297
, protoxide of iron	0·003
, protoxide of manganese	traces
Sulphate of potash	0·211
Phosphate of soda	0·007
Borate of soda	traces

Arseniate of soda	.	.	.	.	traces
Chloride of sodium	.	.	.	.	0·425
Silex	.	.	.	.	0·032
Bituminous matters	.	.	.	.	traces
Saline matters	.		Total	.	5·657

SOURCE PRUNELLE.

Situated almost in front of the Military Hospital, at the corner of the rue Montaret and of the Place Lucas.

This spring belongs to M. Larbaud, and was opened in 1873. By its chemical composition, according to the analysis made at the École National des Mines and at the Academy of Medicine, it is, of all the natural mineral springs of Vichy, the richest in bicarbonate of soda, having 5·295 gr. per quart; whereas the Celestins, Hôpital, Lucas, and Grande Grille have respectively but 5·107, 5·020, 5·004, and 4·883 gr. The temperature is 23° C. The yield has been calculated at 51,800 litres per twelve hours. The water has to be brought to the surface by means of pumps.

The water is only used for export purposes and for the extraction of salts.

M. N. Larbaud intended to have an establishment of baths erected to be supplied by this spring, estimating that the quantity of water would be sufficient for over 250 bath-rooms. He commenced building an establishment which was to contain but 100 baths,

and two large piscines with running mineral water. To convey the water to the bathing establishment it would have been necessary to lay down feed-pipes in the rue de Paris. To do this special permission was required, and this was refused. For some years past M. N. Larbaud has been engaged in a lawsuit about this spring against the Director of the Thermal Company, who, M. N. Larbaud would have one believe, is afraid of the competition that a new thermal establishment at reduced rates would cause to the State Thermal Establishment. We have not to judge this question, but simply explain how it is that the bathing establishment promised so long by M. N. Larbaud, and which this gentleman thinks would be such a boon to the visitors and inhabitants of Vichy, remains *in statu quo*.

The indications of this spring are the same as those of the alkaline waters in general. It does not appear to have any special indications.

The following is the analysis :

Saline components contained in one quart.

Free carbonic acid	.	.	.	.	0·945
Bicarbonate of soda	.	.	.	.	5·295
" potash	.	.	.	.	0·121
" magnesia	.	.	.	.	0·079
" lime	.	.	.	.	0·532
Sulphate of soda	.	.	.	.	0·278
Chloride of sodium	.	.	.	.	0·561
Boracic acid—iron	.	.	.	.	traces
Insol. residue	.	.	.	.	0·030
Total	.	.	.	.	7·841

Various principles contained in one quart.

Carbonic acid	1·771
Sulphuric acid	0·157
Boric acid—iron	traces
Chlorhydric acid	0·341
Lime	0·208
Magnesia	0·025
Potash	0·063
Soda	2·606
Insol. residue	0·030
Total	5·201

SPRINGS AT ST. YORRE.

Formerly only two springs existed at St. Yorre, those belonging to M. N. Larbaud, situated in the Parc Larbaud. In the last few years a number of new springs have been discovered, M. N. Larbaud having added those of the Nouvelles Sources de Vichy (3), Source des Acacias, situated in the same park, and also the Pioniers (3) and the Source des Graviers, all within a few hundred yards of the first. Besides these springs there are the Source Mallat, Source Guerrier, Source Forissier, Source Charnaux, and another spring, as yet unnamed, belonging to the Vichy Company.

SOURCE MALLAT.

Situated at St. Yorre between the railway and the river Allier.

The yield is 43,000 litres in the twenty-four hours. Temperature 12° C.

It is very rich in free carbonic acid, having as much as 2·008 gr. per litre, while the percentage in bicarbonate of soda is quite up to the average, viz. 4·660 gr. per litre. By its comparative richness in arsenic and in iron it ranks among the first of tonic waters.

Its low temperature and the great quantity of carbonic acid it contains should make it admirably suited for exportation purposes.

This spring has only been worked since the middle of 1885, and it is too soon as yet to commit oneself to an opinion as to its therapeutical properties. Analysis :

Saline components in one quart.

Free carbonic acid	.	.	.	.	2·008
Bicarbonate of soda	.	.	.	.	4·660
", potash	.	.	.	.	0·380
", magnesia	.	.	.	.	0·060
", lime	.	.	.	.	0·640
", lithine	.	.	.	.	0·005
", protoxide of iron	.	.	.	.	0·012
Chloride of soda	.	.	.	.	0·510
Arseniate of soda	.	.	.	.	0·010
Sulphate of soda	.	.	.	.	0·024
Silicium	.	.	.	.	0·010
Total	.	.	.	.	8·319

SOURCE GUERRIER.

It is within 200 yards of the St. Yorre railway station and close to the preceding spring.

This spring, opened in 1882, furnished 50,000 litres in the twenty-four hours. The temperature is 13° C. It has a notable quantity of lithine (0·004 gr. per quart) and also of iron.

The water is clear, agreeable to the palate, and by its analysis seems suitable for the treatment of gout and of gravel. It has other indications as well, but what we said of the Source Mallat we must also say of this spring, viz. it is too soon for one to speak positively of its qualities. Like the Source Mallat, it is well suited for exportation by reason of its low temperature. This exportation has already reached a high figure, and experience appears to show that it retains almost the whole of its qualities when uncorked. It makes a very agreeable table water. Analysis :

Saline components in one quart.

Free carbonic acid	.	.	.	.	1·420
Bicarbonate of soda	.	.	.	.	4·910
,, potash	.	.	.	.	0·415
,, magnesia	.	.	.	.	0·215
,, strontia	.	.	.	.	traces
,, lime	.	.	.	.	0·740
,, iron	.	.	.	.	0·035
,, manganese	.	.	.	.	traces
Sulphate of soda .	.	.	.	.	0·240

Phosphate of soda	traces
Chloride of soda	0·414
,, lithium	0·012
Arseniate of soda	0·002
Silicium	0·040
Organic matters	traces
Total	8·443

Various principles contained in one quart.

Carbonic acid	4·798
Sulphuric acid	0·135
Phosphoric acid	traces
Arsenic acid	0·0013
Silex	0·040
Chlorhydric acid	0·261
Protoxide of iron	0·012
,, manganese	traces
Lime	0·288
Strontia	traces
Magnesia	0·067
Potash	0·195
Soda	2·136
Bituminous matters	traces
Total	7·9343

SOURCE FORISSIER.

Recently opened, but not being worked. Situated some hundred yards from the Park Larbaud, and at a little distance off the high road to Nîmes, it is in the middle of a dry ditch, which in rainy weather becomes a small torrent. We understand that, at any

rate for the present, all ideas of working this spring are given up.

The flow is continuous and very considerable, but we have not been able to ascertain the quantity supplied in the twenty-four hours. Temperature 11° C. The analysis is as follows :

Free carbonic acid	.	.	.	.	1·400
Bicarbonate of soda	}	.	.	.	4·90
" potash		.	.	.	
" lime	}	.	.	.	0·85
" magnesia		.	.	.	
" iron	.	.	.	.	0·013
Chloride of sodium	.	.	.	.	0·38
Sulphate of potash and lime	.	.	.	.	0·19
Silex, arsenic, alumina	.	.	.	.	0·30
Total	.	.	.	.	<hr/>8·033

SOURCE CHARNAUX AND THE UN-NAMED SPRING BELONGING TO THE THERMAL COMPANY.

We have not been able to obtain an analysis of either of these springs, which are not being worked for the present. That of the Thermal Company is said to resemble in many respects the Celestins waters. Until, however, an official analysis has been made it will be more prudent to say nothing about these springs.

SOURCE LARBAUD-ST. YORRE.

This spring, and all those that we have yet to describe, belong to M. N. Larbaud.

The Source St. Yorre is situated in the magnificent Park of M. Larbaud at St. Yorre. This park was formerly a large field which went by the name of the "Champ des Boulets," owing to the innumerable springs which oozed from the ground on every side. M. Larbaud opened this spring and another close to it many years ago, near to the building where packing and exportation business was carried on.

The outflow is somewhere about 6000 litres in the twenty-four hours, and owing to its having of late become somewhat intermittent M. Larbaud has resorted to pumps so as to obtain a more regular yield.

This water is excellent for exportation ; it has a temperature of 10° C., and contains all the principles for which the Vichy waters are so noted, being indeed very much richer in the most important constituents than the greater part of the Vichy waters. We give the analysis at the foot of this article.

The exportation of these waters has attained such proportions that it has been found impossible to execute all the orders, although the bottling is carried on day and night without intermission. Under these circumstances M. Larbaud has caused borings to be

made in another part of the Park and has found three new springs ; the *Sources Nouvelles St. Yorre* (discovered in 1885 and used for exportation purposes in 1886). They are practically the same as regards quality as the St. Yorre spring, and have been recognised as such by the State. They are intended to supplement the deficiency of the old St. Yorre Spring.

All these three springs are intermittent and give a supply of about 24,000 litres in the twenty-four hours. Their temperature is about 10° C. They are refreshing to the taste, rich in bicarbonate of soda and carbonic acid gas.

There is another spring in this park, the *Puits Artésien*, which is very similar in quality to the preceding.

These waters are indicated in all cases where exported waters are prescribed, but the distance of St. Yorre from Vichy, and the inconvenient hours of the trains, make it next to impossible to partake of them as they flow from the springs.

Analysis of St. Yorre Spring :

Free carbonic acid	1·549
Bicarbonate of soda	4·838
" potash	0·337
" magnesia	0·274
" strontia	0·007
" lime	0·683
" protoxide of iron	0·010
" protoxide of manganese	traces
" lithia	traces
Sulphate of potash	0·280

Sulphate of soda	0·280
Phosphate of soda	traces
Arseniate of soda	0·002
Borate of soda	traces
Chloride of sodium	0·555
Silicium	0·035
Bituminous matters	traces
<hr/>	<hr/>
Total	8·570

SOURCE DES GRAVIERS.

This spring is situated between the railroad and the banks of the Allier, in front of the Larbaud Park, and belongs to the same proprietor as the preceding spring.

Though the spring is enclosed it is not yet being used ; but from the analysis it appears altogether inferior to the St. Yorre Spring, and probably its use will be more restricted.

SOURCE DES PIONNIERS.

The Pionniers springs are three in number situated a little distance off the Nîmes road, on the right-hand side, about 300 yards before arriving at the Larbaud Park.

The outflow of these springs is very limited, and it is improbable that the waters will ever be profitably

worked. They belong to M. Larbaud, who appears disposed to make them rather the object of an excursion, as he has gone to considerable expense in the construction of a carriage road leading up to them from the high road, and has commenced the building of a kind of summer-house over them.

CHAPTER IV.

THE DIFFERENT WAYS IN WHICH THE VICHY WATERS ARE EMPLOYED.

THE thermal treatment may be internal or external, or the two combined. The internal treatment consists of drinking a certain quantity from a certain spring, or from more than one spring. The external treatment comprises the use of reclining and shower baths, different varieties of douches, with, as an auxiliary, sprays of mineral water, vapour baths, the inhalation of oxygen, and various applications of carbonic acid. There is yet another form in which these waters are employed, by being brought in contact with the mucous membranes, and then thrown out. In this manner they are used for washing out the stomach and for gargling purposes.

When a patient is sent to Vichy for treatment, the first point to decide is whether he is to drink the waters, or only use them externally. The greater number of patients are benefited both by their internal and external use, but it occasionally happens that some of them present a positive counterindication

for one or other methods, and this we will explain in the following chapters.

By drinking the waters and making use of the baths an action is obtained which is general and extends to the whole system. The shower baths, on the contrary, produce a local stimulus.

A. *Internal Treatment.*

It having been decided that the patient is to drink the waters, and the spring having been fixed upon, it remains to determine the time when the water ought to be taken, for how long, and also the quantity.

The most favorable time for drinking is the morning, when the stomach is empty, as then it more easily assimilates the mineral water. The waters ought to be taken at the spring, because there is then no risk of any of their properties being lost. They should be taken in small quantities, with a minimum of twenty minutes or half an hour's interval, the whole prescribed quantity being taken so that at least half an hour elapse between the last glass and the next meal. If any is ordered to be taken in the afternoon, at least one hour should elapse after the lunch before drinking recommences, which naturally must be in the same manner as recommended for the morning.

We have said that the water should be taken in small quantities. Many patients drink as much water as possible, being persuaded that they not only hasten

the cure thereby, but render it at the same time more complete and permanent. All the Vichy doctors recommend moderation. It was Dr. C. Daumas who was instrumental in putting down the excess in drinking by his recommendation that measure glasses, giving the exact quantity by the gramme, should be introduced at the Vichy springs. Some years ago the quantities absorbed were most formidable: eight and ten glasses daily, and even fifteen and twenty glasses, were ordinary doses. Naturally no doctor ordered such quantities, but the patients insisted on drinking as much as they could.

One of the reasons that may be given for this abuse is the freedom accorded to everyone to drink gratuitously. The 15th article of the new regulations states that "the free use of the waters is open to all, without being restricted to medical advice, or permission of any kind." We see no objection to this freedom; it is the patient's option to take or not to take advice as he will, and we are strongly disposed against enforced medical advice as being prejudicial to the credit of the profession.

Among the indications constituting the entire thermal treatment not one is invariable or subject to fixed rules. Pathological accidents, age, sex, and, above all, the peculiarities of constitution, govern and vary them. Every patient has his special constitution, which must be studied separately with a view to special treatment. We repeat that none of the Vichy springs possess any special qualities; the one can constantly

replace the other, and the most suitable is that which the patient is found to digest easiest.

To discover what spring is best suited in such and such a case it may happen that one is obliged to make several trials, but frequently the only reason why the patient cannot digest the water is that he takes too much of it. If some patients can support large quantities with a relative impunity it is not the same with all. Some have difficulty in digesting even small quantities. With others it is liable to congest the brain, and this is particularly so in the case of very sanguineous people, or those having an apoplectic tendency.

These waters react upon the whole of the digestive tract ; they increase the appetite, facilitate and quicken the digestion, at the same time rendering the assimilation more complete, the bowels more regular, the urinary secretion more abundant and easier. They ameliorate the nutrition, increase the strength, and cause a general feeling of comfort. By a too free indulgence in them the very opposite effects are observed.

Dr. Durand-Fardel in speaking of the large doses and their inconveniences, thus expresses himself ('*Lettres Médicales sur Vichy*', p. 48) :

"The smallest inconvenience of these large doses would be their utter uselessness, for such considerable proportions of mineral substances (bicarbonate of soda) could not be introduced into the economy with impunity if they had to be eliminated in a natural manner. Thus, even in the most flagrant cases of

abuse, one never observes at Vichy, or after the Vichy treatment, those phenomena of *alkaline cachexia* to which Cullen drew attention, and that Magendie and Trousseau had met with. But these doses (eight and ten glasses) considerably fatigue the digestive organs and the urinary apparatus, produce irritation in these parts, exaggerate the symptoms of existing diseases, predispose to active hyperæmia, greatly exciting the nervous system, both cerebral and sympathetic, and frequently occasion febrile accidents.

"If one has to deal with a gastralgie and painful stomach, the mineral water must be introduced in very small proportions, for the organ which receives it directly, revolts at once against a dose exceeding in the slightest degree that which it is able to support. If one has to deal with a weakened organisation, without reaction, it will be necessary again to administer the waters in small doses, for the system, unable to react against the mineralising principles introduced, will receive from them rather a toxic than a medicinal action, and I have no doubt that it is in these cases that Magendie and Trousseau found examples of alkaline cachexia, veritable cases of poisoning, of which many other observers have seen examples."

These waters are essentially prescribed in chronic cases ; they are contra-indicated in acute cases. In certain cases of gastralgie they are also contra-indicated, the stomach being unfit to support the mineral water and causing intolerable cardiac pains. In some cases of dyspepsia, where they cause a feeling of

heaviness, sickness, and indigestion they must be abandoned. Sometimes in these cases the addition of a little milk or wine, or even water will overcome the susceptibility of the stomach and still permit with profit the employment of small quantities. In some cases they cause a profuse diarrhoea, even when taken very sparingly, and in such cases the doctor must judge whether to stop them or change the spring. It is principally, however, in enteritis and chronic diarrhoea that the internal use of the Vichy waters is contraindicated. For though some of these cases may be cured by their use, the majority get worse. By a judicious use of baths for a few days, or perhaps at the end of a season, the susceptibility of the internal organism frequently becomes diminished and permits of a normal internal treatment.

The question, How long should the treatment last? is an important one. We should remember that the diseases treated are all chronic ones, that the constitution, when seriously affected with diseases of long standing, recovers but slowly and gradually under their influence, and that time is necessary to perceive the results of the treatment. It is only when the patient has returned home that the improvement in many cases becomes apparent. There is an old saying, "Prevention is better than cure," and we would have our patients apply the moral of this to themselves. It is not when they are seriously ill that they should come to the waters, but when, knowing themselves to be liable to any of the diseases treated with success at

this station, and fearing an outbreak, they wish to ward off the attack. The twenty-one days' treatment cannot be applicable to all cases. It does not require one to belong to the medical profession to understand that two people may have the same disease in very different degrees, and that the time that would suffice for a cure in the first case may be absolutely inadequate in the second. It is the patient and not the doctor who has fixed upon this interval. Both Dr. Casimir Daumas and Dr. Durand-Fardel have a version upon how the twenty-one days' treatment became the custom. As they are both plausible we shall quote them.

Dr. C. Daumas writes :

"Formerly, people came to the springs with more serious views and always for an important object. Women, forced by their organisation to abstain from all treatment for several days, could only submit themselves to it during twenty-one days in each month. They made use of the waters during that period, and hence the origin of this pretended obligation of twenty-one days. It is true that women have very properly liberated themselves from that obligation, but men still adhere to it ! I do not think they have any right to do so, and most certainly they have not the same cause."

M. Durand-Fardel gives the following explanation :

"In every establishment the season ought to have a duration fixed in advance, generally speaking twenty-one days, at least so it is at Vichy. Who invented this ? This institution dates back from the commencement

of time. May we reproach our predecessors for allowing themselves to be so easily subjugated ? Whether you be seriously or slightly indisposed it is all the same ; the season is twenty-one days. Previously the first care of the patients upon their arrival in Vichy was to secure a place for the day of their return journey (there were no railways then), that is to say, in the evening of the twenty-first or twenty-second day ; in the next place they went and consulted their doctor. If one wished to detain them any longer they cried out ; if one wished to shorten their treatment, most of them, not being able to leave until the twenty-first day, continued to take baths to while away the time. Indeed, it is by the number of baths that the number of days of treatment is counted, and the women do not fail to add to the obligatory number of days those that they have been obliged to abstract from the daily baths."

This is tantamount to saying that each individual case should speak for itself ; on an average twenty-one days may be sufficient, but then another twenty-one days may be necessary later on in the season.

The time of year for taking the waters has also its importance. For most people, from the beginning of May to the end of June, and from the end of August to the first fortnight in October would be best. The nature of the disease and the constitution of the patient must, however, sometimes make it preferable to come in the month of July ; this is applicable to those of a lymphatic constitution and for rheumatic people. In the middle of the season Vichy is very relaxing and ought to be

avoided by plethoric people and those having a tendency to congestion. An excellent system is that followed by a number of our countrymen, who make a season at the commencement of May, then go to Switzerland or elsewhere and return for a second season at the end of September or the beginning of October. When the weather is very cold the treatment may yet be followed, but great care must be exercised in bathing, and when possible it is preferable to avoid the cold weather.

We have had occasion to remark elsewhere that "an easy mind" is of the greatest importance as an adjuvant to the success of the treatment. Without it the assimilation of the mineral waters is less perfect, and consequently the cure less rapid and complete. Therefore, as much as possible leave all cares behind you, and without carrying gaiety to an excess go in for some of the amusements which abound in Vichy. It is unwise to overfatigue yourself, but short promenades, drives, an evening now and then at the theatre, will often cause as beneficial a reaction on the general system when low-spirited and depressed, as will a mineral bath, and in some cases more; for assimilation cannot take place properly when the mind is ill at ease.

After the season is over it by no means follows that the treatment is over. As the treatment has to be cautiously commenced, so must it be cautiously dropped. It is usual to have the waters ordered yet for some little time for home consumption. The cold springs are always those which are recommended.

The artificial Vichy waters can in nowise replace the genuine waters, the only salt it contains being the bicarbonate of soda. It fatigues the stomach more than the genuine water, and while it may do good to a certain extent it cannot act as the other does, with its numerous mineral properties so intimately connected and in such a perfect state of dissolution. The mineral water has all the soda it contains absolutely in the bicarbonated state, whereas this salt in the artificial water is not completely saturated and is also found as a neutral carbonate and a sesquicarbonate. In a word, the artificially prepared water acts simply as an alkaline solution and has no connection with the natural water.

B. External uses, baths, douches, &c.

The mineral baths are almost a necessity in the Vichy treatment, and in those rare cases in which drinking the waters is contra-indicated they constitute in themselves nearly the entire treatment.

Their general action is to give increased activity to the different functions of the skin. They increase the perspiration, recall discharges and various eruptions, and are liable to cause an artificial exanthema when their duration has surpassed the proper limits. They exercise a double action, stimulating to the skin and the glands, and, by a feeble proportion of some of

the mineral principles which penetrate the cutaneous surface and is absorbed, they tone the whole system. Thus to stimulate and absorb is the double mode of action upon which are based the elements of their application, and which give rise to beneficial or pernicious results according to the manner in which they have been employed.

They usually produce a general condition of comfort, make the patient feel stronger, and so much are they appreciated that there is almost always a tendency on the part of patients to drink to excess, causing in some cases most serious effects.

They are not applicable to all cases, and in each individual case it is necessary to determine what source by its composition and temperature is best fitted to it. It will differ with the nature of the malady, the age, sex, and constitution of the patient.

The mineral baths are contra-indicated under very much the same circumstances as baths in general are forbidden. They should never be taken by patients predisposed to congestions or cerebral affections of any kind. In heart affections and in most of the functional disorders of the organs situated in the thorax they ought to be prohibited, or, if taken, only with the greatest care. In gouty patients baths frequently bring on an attack of gout. Cases of ascites, even when caused by congestion of the liver, will rarely admit of baths. It has been debated whether a pregnant woman should abstain from the mineral baths. We have no hesitation in saying that this

state is no contra-indication on the condition that the woman has been in the habit of taking ordinary fresh-water baths before coming to Vichy. She must simply use ordinary prudence, not allow the temperature to be too high, and not prolong the bath; if she were in the habit of employing them before, and were to stop them while at Vichy, she might interfere with the normal termination of her confinement. In the case where the patient is very near term, the doctor alone can advise her upon the practicability of continuing or ceasing the thermal treatment, as when this moment approaches certain complications might arise which would render bathing most injudicious.

The baths ought never to be wholly mineral; the usual proportion of mineral water is one half, sometimes but one quarter, of mineral water to three quarters fresh water. One of the smallest inconveniences in taking a mineral bath too strong is the violent irritation it produces on the skin, causing considerable itching, sometimes accompanied by cephalalgia and fever. In gouty patients it may produce apoplexy. These accidents are more frequent in the very warm weather, and extra precautions should be taken for every class of patients in the administration of the baths during the height of the season, when the temperature sometimes borders on the tropical.

Hardly sufficient attention is paid to slight symptoms of irritation, spasms, feverish and broken sleep, and nervous anxiety, which are frequently remarked in patients taking the baths, and in many cases attrib-

uted to the constitution of the patient, but which in reality are caused by the over-stimulating effects of the bath. In women and children, persons advanced in life of both sexes, in those of a feeble and weak constitution, these effects are frequently to be observed, and with them the bath should never exceed more than one third or one quarter of mineral water.

Some patients are very sensitive to even very small proportions of mineral water, and at times the stimulating action is such that the irritation becomes intolerable and the baths frighten the patient. It has been proposed by some of the doctors to add starch or bran to the bath, which often causes this annoyance to cease. We are not partisans of this treatment; the mineral baths have generally a sedative effect when taken in the proper proportions, and we simply reduce the proportion of mineral water. If the itching has become insupportable an ordinary starch bath *without* any mineral water will generally arrest it, and permit the patient to support the next mineral bath.

The temperature of the bath is of vast importance; it is preferable to have it rather too low than too high, for a bath too warm weakens and prevents the stimulating effect on the organism. Naturally the same temperature will not suit every case. Here, as elsewhere, the constitution and age of the invalid, and the nature of the complaint for which the patient is seeking advice, have all to be considered; but in the vast majority of cases a temperature varying from 32° to 35° C. (89·5° to 95° F.) will be found to be that which will give the best results.

The duration of the bath is of nearly as much importance as the temperature. The same rules regulate the one as the other, and too long a stay in the bath will produce very much the same results as too high a temperature. The normal duration is one hour, *i. e.* the time that the patient normally passes in the bath. In many cases this is too long, and half an hour would be sufficient. To speak in a general way, we should say that, to be of any benefit, a quarter of an hour is the minimum and one hour the maximum.

A special kind of baths, the piscine, has special indications as to duration according to the disease treated ; where a certain moving about is possible, an hour's duration is often not excessive.

In old people with sanguine or irritable temperaments, with weak and delicate constitutions, baths of half an hour, twenty minutes, or a quarter of an hour are often more useful and even necessary. In these cases, a daily bath is rarely indicated ; one every two or three days is as much as is good for the patient.

The time of day at which the bath is taken is of secondary importance provided that it is not just after a meal. However, the time that appears to be the most suitable is in the morning before breakfast. A short walk after the bath aids the reaction and should always be taken when possible. Too long a walk, however, particularly if fasting for some time, is not to be recommended.

It is almost needless to add that there are certain

times at which women must abstain from the baths, and that there is no fixed number of baths for any disease ; the number is decided in each particular case by the effects produced, or, in other words, different constitutions, although they may be affected by the same disease, will not respond in the same manner to the same treatment, and where a daily bath may be necessary in the one case, in the other a bath every three days will procure the same result and the daily bath would prove pernicious.

The douches form part of the external treatment ; they are of two kinds, the *percussion* and *ascending* douches, which in their turn are subdivided into many secondary classes.

The percussion douches are very freely employed ; they comprise the different kinds of shower-bath douche, the jet douche, and the circle douche, a variety of the jet douche. The Scotch douche, in which hot and cold water are used alternately, is not in much favour at Vichy.

The percussion douche is used generally or locally according as to whether one desires to obtain a general or local effect. The first is directed upon the body, as far away as possible from the seat of the disease. The principal indications of this class of douche and the manner of using it are as follows :—In numbness of the extremities, upon the hands or feet, as the case may be, to accelerate the circulation and thus produce heat ; upon the vertebral column to stimulate the nervous system ; upon the skin to excite its functions.

The local douches, instead of being directed away from the seat of disease, are directed as nearly as possible to where it lies, and *only* to this place. Their object is to aid in the reabsorption of a congested state, or of some morbid process, by causing an increased activity in the diseased organ and the surrounding tissues.

They are employed in congestion of the liver and of the spleen, and are directed on the part of the body nearest to which these organs lie.

Their utility has not always proved very great, but certain cures or, at any rate, relieved symptoms having followed their use, it is a duty to try them when there is no contra-indication, it being impossible to foresee how much benefit may result from the treatment.

Certain people have a pronounced disposition to active flux or an extraordinary excitability of the nervous system which will not permit of a free use of these douches. The only contra-indications, however, or nearly the only ones, are the existence of painful symptoms. Thus, congestion of the liver is frequently accompanied with intercostal neuralgia, which is independent of the liver complaint and is frequently increased by the application of douches.

In cases of rheumatism, pains in the loins, in the kidneys, and with patients afflicted with gravel, they have often brought much relief. In cases of chronic metritis they sometimes do more harm than good.

The temperature varies considerably, and it is hard to fix even a normal temperature. As a general rule

they are cold, and when warm rarely exceed 35° C. The minimum temperature is from 8° to 9° C., and it is not always easy to obtain the water at this low temperature. The susceptibility of the patient as well as his complaint has to be taken into consideration. The Scotch douche, in which the warm and cold water alternate, produces a much more violent reaction than the cold douche alone.

To facilitate the reaction the patient is generally rubbed down with a hard towel, and in some establishments he has the means of exercising himself with dumb-bells, of using a gymnasium, &c., all of which further the object in view, and may be used both before and after the treatment.

The duration of the douche must essentially be short if it is to be of any use. From thirty seconds to three or four minutes will comprise every case.

The force and the volume of the water projected will vary according to circumstances. Women and children cannot stand as powerful a jet as a man, even if it would be good for them. Where some can support a moderate strength they would fail to support a strong jet. The doctor must judge from his examination of the patient both the duration, the variety, and force of the douche which he wishes the invalid to take.

The ascending douches are divided into two principal classes, the rectal and vaginal douches; one might even add a third class, the perineal douches. These may be qualified as internal or external, according to

whether they penetrate into the two first cavities, or are simply directed against the margins of their orifices.

The rectal ascending douche renders most important services in the Vichy therapeutical treatment; it is employed in cases of obstinate constipation. Sometimes the jet is simply played round the margin of the anus, at other times the cannula of the jet is introduced into the anus so that the water may penetrate higher up. The result is an evacuation very much as would be obtained by an enema, but the rectal douche differs essentially from the former by its mode of action. The enema, instead of tonifying and exciting the mucous lining of the rectum, when constantly employed, only enfeebles and weakens it, so that the more one employs it the more necessary it becomes until it is impossible to obtain an evacuation without it. The ascending douche, on the contrary, has a direct influence on the mucous lining, which it tonifies. It increases the constrictive action of the great intestine and stimulates its secretions in a lasting manner.

They are not employed exclusively for cases of constipation, but are indicated in many other cases where different organs in the vicinity are affected, in certain diseases of the bladder, congestion of the prostate glands, congestion of the body and neck of the uterus, and in prolapsus of that organ. They are sometimes used to recall the catamenia or a flow of blood from piles.

The duration of these douches varies from five to ten minutes. They generally cause some immediate relief, particularly to be remarked with dyspeptic patients ; and this can easily be understood when one reflects upon the intimate relations which exists between the functions of the stomach and those of the intestines ; by acting upon the one it reacts in its turn upon the other.

The vaginal douches are principally employed in chronic affections of the uterus.

They are administered in the bath and should be given with care ; the current of water should flow gently, and in no case is a powerful jet necessary. They are most useful in affections of the uterus. In cases of catarrh, whites, or leucorrhœa, they render great service by the tonifying effects they produce on the organ and the passages. In cases of ulceration of the neck of the uterus, when the catamenia are irregular they may often be employed with most satisfactory results.

While indicating some of the cases in which they frequently give great relief and which they may even cure, we must add that they are not applicable in every one of these cases and that great prudence should be observed in their use. It is not unfrequent to find that they increase the suffering of the patient, and, far from diminishing the discharge, they increase it. In other cases, without causing any pain, they bring on fatigue in the limbs, a general sensation of debility, which may make it necessary to modify or

even to cease this treatment entirely, at least for a period.

C. *Carbonic acid treatment.*

M. Durand-Fardel was instrumental in causing the appliances for this treatment to be erected in the Thermal Establishment. In 1857 he made temporary arrangements which enabled him to try this treatment. Both he and Dr. Willemin having obtained some successes with the carbonic acid, the Thermal Company completed and perfected the installation, which is situated at the entrance to the first-class bathing establishment in front of the Casino.

The physiological action of these baths is thus described by Dr. Rotureau :

"The first physiological action of a general carbonic acid bath which strikes the attention is the sensation of heat felt by the person plunged in the bath ; this heat increases progressively until it is difficult to bear ; it is felt in the epigastric hollow, the internal parts of the members, and particularly of the thighs.

"The feet, which during the first ten minutes participated in the general heat, become almost cold, the pulse so far remains the same, but the face redden's and becomes covered with beads of perspiration. The arterial pulsations diminish from eight to ten in the space of a minute and become irregular, the feet regain their warmth, the members acquire a great

suppleness, and after a quarter of an hour or twenty minutes spent in the carbonic acid bath one experiences a sensation of comfort. When one quits the bath one remarks that the saliva is usually acid and that the urine has the same reaction. The body undergoes such a great sensation of cold that one is obliged to wrap up in very warm clothing so as not to be unduly affected by the outside air, however heated it may be by the solar rays."

This sensitiveness to cold after the bath, concerning which Dr. Rotureau is so affirmative, does not appear to be felt to any great-extent by a number of patients; perhaps there are reasons why it is less felt at Vichy than elsewhere, such as more protection against draughts, &c., until the patient is quite in the open air, but we are rather inclined to think that Dr. Rotureau must have formed the opinion we quote from some extra-sensitive patients. In no case, however, can any harm come from having a shawl or something warm to put on after the bath in case of being attacked with this chilly sensation.

The baths may be partial or general. When the application of the gas is limited to a special part of the body, it causes in it a sensation of heat, accompanied sometimes by a little giddiness.

In many cases of catarrhs, sore-throats, spasms, neuralgia, rheumatism, and paralysis they have been tried with very varying results.

M. Durand-Fardel has had many successes in cases of nervous asthma (dry catarrh of Laennec) that is

accompanied by a very feeble catarrhal secretion. In sciatic neuralgia he has had some very good results also.

This gas diminishes or entirely removes pain, and is often used for this purpose; where it is useless as a curative agent, it is used internally for different purposes, as we shall presently describe.

For external use it has proved useful in the treatment of different sores which remain chronic, showing no tendency to heal. Thus numbers of cases of ulcers, of wounds which have resisted every attempt made to obtain their cicatrisation, have been cured with ease by this treatment.

The douches are given in the ordinary baths. No undressing is necessary; it is usual simply to take off the outer garment. The bath is covered over by a wooden lid with a hole in the centre for the passage of the head. The body is thus entirely covered in, and if the head is left out it is because the patient would run the risk of suffocation if he were to breathe freely the carbonic acid. Pipes are attached to the bottom of the bath and are opened when everything is ready; owing to the great fluidity of the gas it penetrates the clothes of the patient and bathes him as effectually as if he were stripped.

The ordinary duration of the bath is from fifteen to twenty minutes or even half an hour. An hour is exceptionally long.

The inhalations and douches of this gas are indicated in certain affections of the throat and mouth; for

ulcerous pharyngitis it has often a wonderfully curative effect ; for acute coryza, or chronic coryza, that most distressing complaint where the smell becomes destroyed and the patient, without being seriously ill, is never at his ease.

Of all its indications, however, the principal one is perhaps its employment in the treatment of diseases of the uterus.

Both dysmenorrhœa (painful catamenia) and amenorrhœa (absence of the monthly flow) are generally much benefited by carbonic acid douches. In congestion of the uterus its action is not at all so sure.

We mentioned its curative properties for indolent ulcers, &c. Acting on this principle it has been largely employed in the treatment of ulcerations and granulations of the neck of the uterus, as also in uterine neuralgia, and the results have been most satisfactory.

The inhalations and the douches are given by means of long india-rubber tubes, communicating with the reservoir containing the carbonic acid, and are fitted at the extremity with movable pieces to adapt them to the different orifices with which they are put in connection. The inhalations last from five to fifteen minutes. Patients have a difficulty in accustoming themselves to this treatment for a few days.

CHAPTER V.

HYGIENE AND DIET.

JUST as indifferent attention to hygiene and diet is the cause of many diseases, so is due regard to these two points of paramount importance when the disease has declared itself, for without it the most judicious treatment often proves ineffectual. If this is true with the generality of diseases its observance is especially called for in the number of ailments treated at the thermal springs both at Vichy and elsewhere, and although certain maladies may, and often do, require a special hygiene and a special diet, there are general rules which apply to all cases; the exceptions will be pointed out when treating of these diseases in detail. As one of the principal properties of the Vichy waters is to stimulate the functions of the skin and of the digestive organs, the hygienic treatment to be followed must be one that will second the action of the waters.

To assist the secreting power of the glands of the skin, exercise is necessary. Long and fatiguing walks are contra-indicated; it is only moderate exercise that will fortify and act beneficially. Drives in the open air, or sitting in a place neither too cold nor too warm

and free from draughts, must be resorted to by those who cannot take a moderate walk.

The fresh air, by reason of the large quantity of oxygen it contains, is sufficient of itself to cause a certain stimulus to the skin, and thereby accelerates the circulation and increases the activity of the skin glands. Another kind of exercise which may be employed with profit is the use of dumb-bells, gymnastics &c.; all these means tend to the same object, viz. to increase the activity of the circulation and the secreting powers of the different glands of the skin. If for the majority of the patients coming to Vichy, walking is strongly indicated, such as in diabetic cases, in cases of gout, &c., there are other cases in which it is as strongly contra-indicated; this is so in most affections of the uterus, where repose and rest, and often the horizontal position, are absolutely necessary. Patients belonging to this category should hardly put their foot to the ground, at any rate at the commencement of the treatment; sometimes even carriage drives must be prohibited because of the jolting. Here, as elsewhere, however, there is no hard-and-fast rule, and we meet with some patients suffering from uterine disorders who are the better for a little walking; of course it will depend upon the nature of the disease—its advanced, acute, or chronic state.

For all patients the amount of exercise must be proportionate to the age, sex, and strength. Thus a young girl of sixteen, suffering from dyspepsia, would

be able in the majority of cases to take longer walks with less fatigue than a young girl of the same age suffering from chloro-anæmia. Both have need of exercise ; but in the second case, if exaggerated, the palpitation of the heart would be more violent, the breathing more laborious, and, instead of deriving profit from the walk, the over-fatigue would produce the very opposite effects.

While the body should have plenty of exercise where it is practicable, it is the very contrary with the mind. All business matters should be rigorously set aside during the cure if one wishes to obtain the full benefit of the treatment. We are aware that this is not always possible, but the patient who studies his own interest will do his best to have as little to do with them as possible. It is not necessary that the mind should remain quite unoccupied ; on the contrary, something to change the train of morbid thoughts which so often harass the patient and interfere with the efficacy of the treatment is to be desired. Besides the different promenades, let him frequent the reading-room, go to the theatre, and, in a word, take any quiet amusement which he may feel disposed for. There are certain amusements, however, which instead of calming will only excite, and which should therefore be avoided by the patient who is really solicitous about his health and who has come to Vichy hoping to obtain a cure or alleviation of his sufferings —we mean the gaming tables—which means, not unfrequently, late hours and restless nights. The

exhausted system is not able to react under the treatment, and the patient may return home no better than when he first arrived.

Speaking about the theatre makes it necessary for us to say a few words about clothing. The heat at Vichy is often very great, almost unbearable, during the day, and that more or less during the whole season, if fifteen days be curtailed from each end; the temperature at night-time is very considerably lower, so much so, that at times it is almost chilly, when the day temperature may have been unusually high. A natural consequence is that if the same clothing be worn during the day, and no addition be made when returning from the theatre, ball, concert, &c., great risks are run of getting a chill. The same risks are run in the daytime if the clothing is too light, sitting down in the open air after a brisk walk with very light clothing being a very usual way of getting a chill,—chill that not only aggravates most of the complaints treated here, but may even lead to fatal consequences. To avoid this risk, the dress must be neither too warm nor too light; if too warm it causes profuse perspiration, weakens and fatigues the patient. We have explained the risks run by having it too light. A proper medium is necessary for the daytime; for the evening a light overcoat or shawl should always be at hand when leaving the theatre or when sitting down in the open air. Both sexes should wear flannels, which absorb the perspiration and keep up a gentle temperature over the whole body.

Another point to which attention has to be paid is the digestion. It has to be facilitated; exercise will materially aid in this result, but certain rules should be remembered. It must not immediately follow the meal. An interval of about an hour should elapse to allow the chymification to commence or the digestion will be too rapid.

The quantity and quality of the food must be considered, whether liquid or solid, and also the cooking. Normally most people eat a great deal more than is either necessary or good for them, and particularly is this the case at Vichy, where the waters and the exercise stimulate so powerfully the appetite. Before indicating certain substances which it will be as well to avoid, we will say a few words upon what diet is suitable in health, both as regards the quantity and quality, and then show in what respects it should be modified by patients under treatment.

To arrive at the proper estimation of a reasonable diet in twenty-four hours, it is necessary to consider the amount of the excreta daily eliminated from the body; the ingesta or alimentary substances introduced into the digestive tube ought to be in the same proportion when the weight of the individual remains stationary. The excreta contain chiefly carbon, hydrogen, oxygen, and nitrogen; the other substances, such as sulphur, phosphorus, chlorine, potassium, soda, &c., need not occupy us.

Carbonic acid and ammonia are given off from the lungs, *i. e.* the elements of carbon, oxygen, nitrogen,

and hydrogen ; the urine contains the same principles in different proportions. In the sweat and fæces the elements chiefly represented are carbon, hydrogen, and oxygen. By all the excretions large quantities of water are got rid of daily, but chiefly by the urine.

The following table (Landois) gives the relations between the amounts of the chief elements contained in these various excreta in twenty-four hours.

	Water.	C.	H.	N.	O.
By the lungs.....	330	248·8	—	?	651·15
By the skin	660	2·6	—	—	7·2
By the urine	1700	9·8	3·3	15·8	11·1
By the fæces	128	20·	3·	3·	12·
Grammes.....	2818	281·2	6·3	18·8	681·41

To this should be added 296 grammes water which are produced by the union of hydrogen and oxygen during the process of oxidation. There are 26 grammes of salts got rid of by urine and 6 by the fæces. As the water can be supplied as such, we have only to direct our attention, in furnishing food, to the losses in carbon, nitrogen, and oxygen.

Carbon and nitrogen are excreted in the proportions of 281·2 grammes and 18·8 grammes respectively daily, and will suffice for our basis.

If the diet could consist of these elements alone, the problem would be solved at once; a corresponding weight of charcoal and of atmospheric air would be all that is necessary, but it has been proved by experiments that it must consist of several substances.

Not to enter too deeply into physiology, it will suffice to say the *mixed* diet is the only one suitable. The quantity of food requisite for a healthy man of average height and weight may be stated in the following table (Parkes).

	In laborious occupation.		At rest.
Nitrogenous substances .	6 to 7 oz. av.	...	2·5 oz.
Fats	3·5 to 4·5 „	...	1· „
Carbo-hydrates .	16 to 18 „	...	12· „
Salts	1·2 to 1·5 „	...	.5 „
	—————		—————
	26·7 to 31 „		16 „

The above is dry food, but as this is nearly always combined with 50 to 60 per cent. of water, these numbers should be doubled, and to this should be added 50 to 80 oz. of fluid.

Bread and meat will furnish the necessary quantity of carbon and nitrogen. The approximate quantity of bread necessary to supply the losses in these elements would be 1000 grammes, containing 300 grammes of carbon and 10 of nitrogen, and 300 grammes of meat containing 30 grammes of carbon and 10 of nitrogen. These quantities would, strictly speaking, be sufficient, but are generally considerably surpassed, while

vegetables and fruits replace the one or the other in certain proportions.

Man requires that his food should be cooked, otherwise the greater part of the substances introduced into the alimentary canal could not be digested. By cooking, certain substances become soluble which were insoluble previously ; uncooked flour, for instance, cannot be acted upon by the human saliva, but, once cooked, the grains separate and split up and become amenable to the influence of this liquid.

Upon vegetables, the cooking produces the necessary effect of rendering them softer, so that they can be more readily broken up in the mouth ; it also causes the starch to swell up and burst, and so aids the digestive fluids to penetrate into their substance.

Coffee, tea, beer, spirits, and wine are all of them in different degrees stimulants, and aid the digestion when taken within proper limits ; they are *unnecessary*, however, in the majority of cases.

Having thus rapidly passed in review what is needful to sustain life in a healthy individual, and what he can eat as regards quantity and quality, it remains to consider how the diet of patients under treatment would be affected.

In the first place it must be borne in mind that even when in perfect health all stomachs have not the same tolerance. Some people have a stomach that might be likened to that of an ostrich ; they can digest everything, even those things which are reputed most indigestible, whilst another cannot tolerate

certain substances that pass as being very easily digestible.

It is necessary, then, for those people who have special repugnances for certain aliments, or who may have special likings for certain substances, but who are aware that they digest them with difficulty, to eschew them altogether during the treatment.

A great proportion of the patients are affected with diseases of the stomach ; sometimes this is the only disease ; in other cases it is simply a complication, or secondary to the disease for which they have come to obtain relief ; these should only eat easily-digestible substances. They still have a large number of aliments to choose from, and their diet can be both varied and choice. We subjoin a table of substances in their approximate order of digestibility, beginning with those which are least digestible. This table has been compiled by Dr. Beaumont, who, having a patient afflicted with a fistula of the stomach, introduced the aliments direct into the stomach by the fistula, and was able to follow the process of digestion.

Four to five hours' digestion :

Wild duck, boiled cabbage.

Three and a half to four hours' digestion :

Boiled or fried pork, grilled veal, roast duck,
soup made from boiled beef.

Three to three and a half hours' digestion :

Hard boiled eggs three and a half hours ; soft
boiled, three hours ; roast beef, beef-steak,

boiled beef, grilled pork and grilled mutton, apple pudding, boiled carrots.

Two and a half to three hours' digestion :

Unboiled milk, boiled gelatine, cream, beans, roast potatoes, roast or boiled turkey, roast duck, roast sucking-pig, chicken, grilled lamb, oysters.

Two hours' digestion :

Tapioca, barley, boiled milk, raw eggs, boiled cod-fish, cauliflower, grilled ox liver.

One and a half to two hours' digestion :

Sago, apples, salmon trout, brain.

One hour's digestion :

Rice, tripe, pigs' feet.

The conclusions to be drawn from this table are that delicate stomachs should in general avoid vegetables, which are much less easily digested than animal matter; truffles and mushrooms are particularly indigestible. Amongst those which are the least indigestible are green peas, asparagus, and artichokes. Potatoes, plain boiled, are better than fried potatoes. According to the weakness of the stomach patients should limit themselves to fish, chicken, and the small kind of game; for those less delicate, underdone beef and mutton.

The lunch might be composed, with certain variations, somewhat as follows :

Eggs, plain boiled or omelet, cutlet, chop, beef-steak, salmon trout, whiting, soles, potatoes, greens,

French beans, asparagus, artichokes, lettuce, spinach, cherries, apricots, currants, gooseberries, ripe pears, figs, grapes, cream, cheese, jelly.

For dinner, any of the preceding, to which might be added : tapioca soup, vermicelli soup, carrots, roast beef, roast lamb, game in moderation, duck, &c.

Spices should be sparingly used. Our countrymen indulge too freely in mustard, pepper, and cayenne ; a little may do no harm, but an excess is injurious. Salt at discretion.

The question whether acids should be eliminated from the diet as being contrary to the base of the treatment, which is alkaline, was a much disputed question some time ago, but now there are few doctors who have not resolved this question in the same manner. The question was put thus : an alkaline medicament being introduced into the economy, the acids which are introduced afterwards will neutralise the first in the proportion to which they penetrate into the system, and will therefore neutralise its effects. At a first glance there might appear to be some truth in this hypothesis, but when the question is examined in a scientific manner, with the aid of chemistry and physiology, it turns out to be almost devoid of foundation.

M. Durand-Fardel, who has examined this question with the same care and conscientiousness which characterises all his researches, writes thus : (translation.)

" There is an important distinction to be made upon the subject of the introduction of aliments, condiments,

or acid drinks. There is a distinction to be made upon the action that they may exercise as acids, in the one place upon the stomach, and, on the other hand, on the blood and the whole system.

"When one takes acid substances, it is as acids that the stomach receives them. Now, among the patients who frequent the thermal springs, and Vichy particularly, there are a great number whose stomachs tolerate with difficulty the presence of acids. These substances cause a painful sensation upon the surface of this organ, or else do not find its liquids in a suitable condition to enable them to undergo the necessary transformations. This is the cause of pains, acid eructations and burning sensations (pyrosis), symptoms so well known to dyspeptics, and above all to gastralgic patients. This appears to be a probable reason why acids are forbidden with the use of mineral waters.

"But if one studies the acids with a view to discover how they penetrate the system, their action on the blood, &c., this is what one finds: the acids of aliments and of drinks, being organic acids, once introduced into the system, are decomposed in such a way that the result of their assimilation no longer constitutes an acid, but an alkaline production."

The principal acid contained in wine is tartaric acid, and wine has often been forbidden under the mistaken belief that it interfered with the efficacy of the treatment. Considering that tartaric acid, as well as malic and citric acid, are converted into alkaline carbonates when once introduced into the system, this cannot be

a reason for prohibiting its use. What is of far more importance is the quantity of alcohol contained in the wine.

The effects of the Vichy waters are sufficiently exciting in themselves to render it judicious not to take any great quantity of stimulants. Those who are in the habit of taking wine, beer, or liquors at their meals have no need to drop wine entirely, unless there are special indications which the medical adviser will appreciate; but it will be well to replace the more alcoholic liquors by a light red wine: the Beaujolais is what is most drunk at Vichy and cannot do any harm. We do not think that a glass or two of good beer in the course of a day can do any harm to those in the habit of taking it, and if beer is frequently excluded from the diet it is because the patients will not content themselves with a limited quantity, but, whenever thirsty, call for a glass of beer.

We entirely disapprove of strong coffee. It acts powerfully on the nervous system, and is specially contra-indicated in nervous women and children. We would say the same for tea. English ladies, since the "afternoon tea" practice became fashionable, simply saturate themselves with this beverage. At the present moment tea is destroying the nervous systems of our compatriots in a degree not far removed from that of alcoholic drinks. It destroys the stomach, makes the drinker nervous and what is popularly termed hysterical. In moderation it can do no harm, but when you come across people who take from ten to

twenty cups a day of this beverage, it alters materially the face of matters, and we have had many patients suffering from dyspepsia, &c., whose ailments have entirely been brought on by abuse of this drink. French people do not drink much tea; they indulge, however, pretty freely in black coffee, the men more than the women, and the same effects are to be remarked with them. Three cups of tea daily ought to be a maximum. How many Englishwomen would be able to content themselves with this quantity?

The water drawn from the greater parts of the wells in Vichy is not good drinking water; it contains a large proportion of chalk, and is inclined to aggravate the symptoms of some diseases, notably in some affections of the stomach and intestines. The water supplied from the reservoir situated a little outside of Vichy, and which comes from the Allier, feeds most of the town fountains, and is the water supplied wherever pipes are laid on. Without being excellent, it is of good medium quality, and can be drunk with impunity. Those, however, who prefer really good table water, should take the natural waters of Châteldon or Condillac, which can be had at all the hotels in bottles. Both these are good table waters, and if there is a preference we think it is in favour of the first.

To conclude this chapter and resume what we have said upon the “acid question,” we have but to say that, except in the cases where the Vichy waters are administered by way of absorbents of the gastric acids, the action of this mineral water is the same, whether

one allows or forbids the use of wine, vinegar, or very acid fruits, such as lemons and currants, at the same time as the water is being drunk. What is still more, if, while employing these waters, one takes at the same time fruits or drinks, containing acids not nearly free, but in fact acid alkaline salts, such as are found in strawberries, grapes, and cherries, the alkaliisation of the system is much more marked than if the Vichy waters had been administered alone.

Thus, far from effacing from the Vichy diet aliments and drinks containing acid alkaline salts, it is useful on the contrary to take them whenever the digestive and assimilating powers will permit it. These aliments and these drinks are particularly indicated in the treatment of diseases when the Vichy waters have to be taken in considerable quantities ; by their means one obtains a sufficient alkaliisation with a smaller amount of ingested water. Again, in the cure of gravel by the use of cherries, and still more so in the grape cure, a better and speedier result is obtained in joining to the treatment the use of the Vichy waters ; these waters in saturating the acid-alkaline salts contained in the cherries and grapes, assure their absolute physiologic combustion.

CHAPTER VI.

DISEASES TREATED AT VICHY.

DISORDERS OF THE STOMACH.

A. *Dyspepsia.*

DYSPEPSIA (from $\deltaυσπεψια$) difficulty in digesting, is one of the most common complaints that exist. The function of digestion is of a physico-chemical nature, and any interference with the due performance of the several phases of the function will lead to indigestion. It is a prominent symptom of a number of acute and chronic maladies. Whether dyspepsia can ever exist as a separate malady is a disputed point. Considering, however, that it is frequently the only diagnosis that one can make, we think that for convenience' sake it is as well to consider that essential dyspepsia is possible.

For digestion to be possible two factors are necessary: 1st, movements or muscular contractions, 2nd, secretions. Should the regularity or energy of the muscular action of the stomach be interfered with in any way, should it become too slow or too fast, should the harmony between this mechanical action

and the chemical action, *i. e.* the secretions, no longer exist, the digestion becomes irregular and incomplete, there is, in a word, "difficulty" in digestion, *i. e.* we have dyspepsia. This is, generally speaking, rather an inconvenience than a disease, which patients often consider of little importance, but it is often a painful, dangerous, and distressing inconvenience. Before detailing the many causes which may give rise to this complaint we shall describe its symptoms.

One of the principal characteristics is its intermittent form : it always appears before or after a meal. There is a general feeling of discomfort, a heaviness in the region of the stomach, frequently accompanied by headache. These symptoms generally disappear when the food has been digested, to recommence again at the next meal ; sometimes a drowsy feeling comes over the patient as soon as the repast is over. The appetite is languid, but the meal once begun, it appears to increase. Certain aliments cannot be taken ; the digestion is frequently accompanied with flatulency ; pain, eructations, and sickness may supervene during or after the meal ; constipation is usual. These different phenomena may exist in a higher or lower degree ; all may be present or a single one. The general health may remain pretty good, but if the dyspepsia increases in intensity, after a time the whole system is affected and a state of cachexia declares itself ; the skin becomes pale, of an earthy colour, the patient becomes very thin, and quite unfitted for any laborious work.

We have already remarked that dyspepsia is frequently associated with some other disease, of which it may form one of the symptoms. It will often be remarked in different diseases of the liver, cancer of the stomach pulmonary phthisis; different diseases of the intestinal tube generally bring it on, such as chronic gastritis, *enteritis*, and dysentery. It appears in the convalescence of all serious diseases, all cases of debility and organic decay. It is very commonly observed in women suffering from uterine complaints, amenorrhœa, leucorrhœa, metritis, in cases of pregnancy, both towards the commencement and at the end, and sometimes during the whole course of this physiological act; in the diseases of the heart, kidneys, bladder, &c.

The mechanical action of the stomach may be diminished, and cause constipation, or increased, and cause diarrhœa. We have already said that perfect harmony in action should exist between the secretory functions of the stomach and its muscular action, otherwise indigestion will be the result.

The mechanical action is under the control of the nervous system; a sudden fright, a chill, a shock of any kind, mental worry, any such influence is sufficient to interfere with the muscular action, which, in such cases, is generally accelerated, and diarrhœa ensues. The action may be diminished by a distended condition of the stomach; from the nature and quality of food, both liquid and solid, either result may be produced. The secreting powers of the stomach may be increased

or diminished ; they may be deficient in quality. The stomach, however, is not alone to be considered when treating of the imperfections of the chemical changes.

The various secretions, whose office it is to convert into a fluid and diffusible form those alimentary principles without which such preparations cannot be absorbed, have also to be considered, but, not to enter too deeply into the physiology of digestion, we will content ourselves with simply mentioning them. They are formed by the blood from the salivary, gastric, pancreatic, hepatic, and intestinal glands. It is clear that for these juices to be secreted in proper quantity, or of proper composition, the blood, no less than the secreting cells, must be in a healthy condition.

The secretions may be imperfect in quality, deficient in quantity, or both, and the following are some of the causes leading to such results.

1. *Perverted nervous influence.*—This action we have already referred to. The direct control of the nervous system over the quantity and quality of the secretions is well known, and there is every reason to suppose that the temporary arrest of the salivary fluid so frequently accompanying any severe mental disturbance, such as fright, represents but in a transitory manner a disturbance that may be more lasting and serious in lesions of the central nervous organs.

2. *Abnormal blood-supply.*—A deficiency in blood being almost always associated with an alteration in its quality, it is easy to see why in a case of anaemia

the digestive function suffers, whilst the more it fails the more will the anaæmia increase.

Having passed in review some of the principal causes which occasion dyspepsia, and which are more or less beyond the direct control of the patient, we will now mention certain causes over which he has a very powerful control.

Diet before everything.—The contact of solid bodies excites the glands of the stomach, and determines the secretion of gastric juice. If the food introduced into the stomach is directly attackable by the gastric juice, it is probable that the secretion diminishes or ceases as soon as the food is sufficiently elaborated. Should the food, on the contrary, be indigestible or difficult of digestion, either by reason of being badly cooked, or being too abundant, the flow of the gastric juice will be more considerable, the digestion will last longer and be less perfect. This state of things, continued for some time, occasions dyspepsia. When the food introduced into the economy is insufficient in quantity or in quality, or in both, the gastric juice is likely to be both inferior in quality and quantity; when it becomes too acid it produces a burning sensation in the epigastric region.

There is very little doubt but that more food is daily in the habit of being taken than is actually required to restore the tissue waste. The results of an excessive ingestion of food give rise, in a large majority of individuals, particularly if the exercise taken be but little, to a feeling of lassitude and want of

energy, both muscular and mental, a liability to headache, chiefly frontal, constipation, or, more rarely, diarrhoea, and other symptoms of indigestion. By abuse of different kinds of food the same results may be brought about. Immoderate eating and drinking cause the stomach in the long run to become dilated, and thus diminish its natural irritability and secreting powers. Other abuses, such as an inordinate use of condiments, or indigestible food, fatigue the stomach.

There are three abuses to which we would particularly call the reader's attention : smoking, abuse of coffee, abuse of tea. We consider that in moderation all these are rather beneficial than otherwise, as they certainly assist a languid digestion. We most certainly do not wish to cry down smoking ; it has become very popular amongst some members of the medical profession of late years to try and make out that smoking is most dangerous to life, that it weakens the brain and hastens the final termination. The reverse could be said for it ; it stimulates the brain, aids intellectual work, and prolongs life in that it calms and soothes. These remarks apply, of course, to smoking in moderation. Carried to excess it is certainly most baneful ; it interferes with the digestion, and, instead of causing a soothing effect, produces an irritable disposition. By all means while suffering from dyspepsia limit your smoking to a maximum of two or three pipes or cigars per day, as if smoking can and does produce dyspepsia when carried to excess

so will it aggravate it, if not diminished, when the dyspepsia is in existence. In moderation smoking is a most innocent habit.

Both tea and coffee act powerfully on the nervous centres. Tea in England and coffee in France have much to answer for in the production of the complaint of which we are treating. Tea is ingested in much larger quantities than coffee, and has a mechanical action as well as a nervous one. It tends to cause dilatation of the stomach when three, four, and five cups are taken one after the other, and, through the nervous centres, reacts upon all the organs of the body, the stomach being one of the first to be affected. Black coffee, that is, very strong coffee taken without the addition of milk, acts more energetically than tea, but as it is taken in small quantities its action is proportionately the same. One or two cups of tea, one strong, or two ordinary strength cups of coffee, should be the limit in most cases of dyspepsia, and often would be much better left entirely alone. Pastry is an article of diet that will not suit all stomachs.

Meals ought to be taken at regular hours, the food properly masticated, and a certain proportion should exist between the solids and the liquids.

In speaking of mastication, we would mention that the want of it is sufficient cause of itself to bring about indigestion. Some of our patients, when we have told them to masticate their food better, say that the imperfect or diseased state of their teeth will not allow them to chew. We always tell them to go to

the dentist, and get their teeth attended to and if they have lost a number of teeth to have false ones. Without teeth one cannot chew. When the mastication is imperfect nothing will get the digestion right ; and as there is nothing to be ashamed of in wearing false teeth, we cannot see why they should not be procured, particularly when in some cases, looking at it from another point of view, they may advantageously replace teeth that can no longer be likened unto pearls.

Excessive labour, sedentary habits, habits of indolence, the abuse of pleasure ; sorrow, emotions, unhealthy food, unhealthy dwellings, all tend in the same direction to produce this disorder. We have shown that one of the special characteristics of this disease, and which forms its peculiarity, is that the symptoms of dyspepsia appear *after* meals. Do away with the necessity for eating and you do away with dyspepsia, but as this treatment is not practicable another has to be sought, and one of the speediest and surest is the judicious use of thermal waters.

The stimulating effects of the waters are soon felt upon the different coats of the stomach : the appetite gradually increases, the digestion becomes accelerated, and the distressing and painful symptoms which accompanied it previously disappear.

Moderation, however, must be observed in the use of these waters, otherwise a too stimulating action may be caused ; the beneficial effects of the treatment will then disappear, and the cure is not only endangered

but there is a risk that the disease will increase in intensity.

Again, all kinds of dyspepsia are not amenable to the water treatment. Acute dyspepsia, dyspepsia symptomatic of acute affections, and certain chronic affections in which cancer takes the first place, would be treated thus, not only without profit, but positive injury might ensue.

Most chronic cases of dyspepsia, however, are speedily improved or cured by this treatment, which must be seconded by a proper observance of the indications resulting from the symptoms and their causes, as already explained.

We have shown that great attention must be paid to the diet, both in regard to the liquids and to the solids; all highly indigestible substances must be avoided; great moderation must be employed in the use of stimulating beverages. Regularity must be observed in the time of taking the meals. Moderate exercise should follow each repast to assist the digestion, but an interval of about an hour should be first allowed to elapse.

The change of air and rest from mental worry and anxiety are most important. This is easily obtained at Vichy, and it is the patient's own fault if, instead of taking quiet amusement, such as going to the theatre, making excursions on foot or taking drives in the environs, he prefers to frequent the gaming tables. In the latter case he might almost as well remain at home, for he is neglecting one of the most important

adjuvants of the treatment,—rest from mental worry and excitement.

The last but not the least part of the treatment is the washing out of the stomach. This is not applicable to all cases ; the milder cases do not require it, but in the more severe forms of dyspepsia it is pretty generally indicated and largely made use of by most of the Vichy medical men. It is generally applied before meals, and from the results that this treatment has given we think that it is now proved that its efficacy is both real and powerful. We never hesitate to prescribe it when the indication appears to exist.

Dyspepsia is sometimes accompanied with very violent pains, cramps, &c., which occur independently of aliments being introduced into the stomach, and quite independent of the digestion. This constitutes another disorder, gastralgie, which we shall describe in the next section.

B. *Gastralgia.*

Gastralgia ($\gamma\alpha\sigma\tau\eta\rho$, the stomach, and $\alpha\lambda\gamma\omega\varsigma$, pain) is a neuralgia of the nerves of the stomach, the pneumogastric and the great sympathetic.

This complaint is met with in different forms, but there almost always exists heartburn (cardialgia) and cramps. The pain is sometimes excruciating, coming on at intervals and lasting from half an hour to one or two hours. It is frequently accompanied with vomiting, which may or may not relieve the symptoms.

Sometimes there is but a mitigated feeling of burning, which may or may not be continuous. This sensation may be limited to the cardiac orifice of the stomach or may extend some distance into the oesophagus. These pains do not occur only at meal times, as in dyspepsia, but are altogether of an intermittent nature, the introduction of food into the stomach sometimes causing momentary relief. They are most varied in their nature ; sometimes they spread in every direction, into the back, the sides of the thorax, down into the belly and even affect the kidneys. When the attack is violent the colour quits the sufferer's face, the features become contracted, the pain causes him to cry out, and instinctively he tries to alleviate the torture by pressing with all his force on the part where the pain is most intense.

Gastralgia can be an essential disease, that is to say independent of any organic lesion or other pathological condition.

When it is symptomatic of another disease its characters are still pretty much the same. Every disorder of the stomach may give rise to it, cancer, ulceration, gastritis or dyspepsia. It may be met with in hysterical patients, affections of the uterus, in gout, phthisis, &c.

Anæmia, from whatever cause, is a fruitful source of this malady. There is a particular form of gastralgia met with in chlorotic subjects, in which a crisis is brought on at once upon the smallest particle of food being introduced into the stomach. This gastralgia

is thus produced as in dyspepsia by the introduction of food into the stomach, but it differs from dyspepsia in that its principal character is the pain it gives rise to, which is absent in ordinary dyspepsia without complications.

Gastralgia and dyspepsia may be associated the one with the other, the latter having given rise to the first. The principal causes which may produce this complaint are irregular hours in eating, chills, all kinds of fatigue and excess, and a too exciting diet.

The Vichy waters having an exciting influence are contra-indicated in cases of gastralgia where the pains are continuous ; here they appear only to make the suffering greater. They give very good results when the attacks have a determined character, such as cramps in the stomach ; a cure or a considerable improvement in the symptoms may be obtained in these cases. If the disease is recent the improvement does not appear to be so certain or so prompt as in chronic cases. The vomiting that so often forms part of the symptoms seems to be most favorably influenced by the waters ; but they must not be taken if the pain be acute and incessant and the vomiting continuous, as the waters in such a case do more harm than good.

The waters ought always to be administered during the intervals of the attacks, and as far off from their beginning as possible.

The waters should be drunk in small quantities, above all at the commencement of the treatment, as this class of patients have a difficulty in supporting

the waters. The slightest abuse of them may bring on a fresh attack, and patients will do well to bear this in mind, as not only will the pains be more violent, but the treatment will have to be discontinued for some time.

When the mineral waters cannot be borne, recourse may be had to mineral baths, but the proportion of mineral water to that of fresh water must be determined by the doctor in each individual case.

CHAPTER VII.

DISEASES OF THE INTESTINES.

A. *Enteritis.*

ENTERITIS (*ἐντερίον*, a bowel) signifies an inflammation of the intestines. Under this head are included all those structural changes of the mucous membrane of the intestinal tract which primarily follow the application of an abnormal irritant, provided that the irritant be not of sufficient intensity to produce absolute destruction of tissue. The inflammatory process may present considerable variety in type. It may simply be a "catarrh," occasioned by a slight inflammation, or belong to the dysenteric type, where the inflammation has acquired vast proportions. Between these two types there exists a variety of intermediate ones. The inflammation may be localised to some definite part of the intestinal tract or be general. In the first place, the name of the part is added to enteritis, as entero-colitis, &c., but this nomenclature is of secondary importance as far as the lay reader is concerned.

It is useless for us to enter into an explanation of

acute inflammation of the bowels, as in their case the waters are contra-indicated. We will therefore limit ourselves to chronic inflammation, where their efficacy is undoubted.

Enteritis is rarely chronic from the commencement; it almost always has been preceded by an acute or subacute stage. The bowels exceptionally may be confined; as a general rule, however, there is a good deal of diarrhoea; in an average case some four to eight stools daily. This diarrhoea generally follows each meal, it is accompanied with considerable pain, which varies greatly in intensity in the different cases, but these colics are always less violent than in the acute stage of the disease. The character of the stools is very variable; as a rule they are semi-liquid when diarrhoea exists, or they may consist chiefly of a liquid with a few feculent flakes, mucus being constantly present. The solid and the liquid evacuations frequently alternate. The appetite still remains, but as the assimilation of the food introduced into the body is very imperfectly performed, the result is that the patient loses flesh, and would become cachectic if not put under proper treatment. The face becomes drawn, the complexion has a muddy appearance, and to a casual observer would be considered phthisical.

Chronic enteritis may last for months and even years, and present many alternatives, now improving, now getting worse, but must eventually terminate in cachexia. In children it runs its course very much more rapidly.

Some of the causes which bring on the disease are improper diet, whether it be wanting in quality or quantity, or be excessive. The climate is another cause; unhealthy and damp climates predispose to it. Another very important cause is obstruction, either at the right side of the heart or affecting the portal circulation in the liver.

When it is symptomatic of another disease, it is in cases of Bright's disease, or of a herpetic, scrofulous, rheumatismal diathesis, &c., that it will frequently be met with.

The waters of Vichy are difficult for the stomach to bear with the greater number of patients affected with this malady, and in any case require to be administered in small quantities and with great prudence. Bathing and douching are employed with profit, and prepare for the absorption later on of the mineral water, but it is essential that the doctor should regulate this treatment, and watch carefully his patient through the whole course of it.

The value of the mineral waters varies greatly according to the cause which has occasioned the malady, but in all chronic cases of enteritis this treatment might be tried, and ought to be tried when all others have failed, for at best it is a most rebellious disease, and better results are obtained from the use of these mineral waters than any other form of treatment.

Special attention must be paid to the diet. With some patients large quantities of milk will be ordered;

others cannot support milk ; here again the physician must particularise in each individual case, as no hard-and-fast line can be laid down. The patients must remember, however, that this question of food plays a vital part in their chances of cure, and that they must keep strictly to what is ordered or allowed them, if they do not wish to waste their time and hazard their cure. As a general rule, the diet should be abundant and nutritious, in consideration of the debilitating and wearying character of the malady.

B. *Dysentery.*

Dysentery ($\deltaύς$, with difficulty; $\epsilonντερον$, an intestine) is a specific febrile disease, characterised by considerable nervous prostration and an ulcerous inflammation of the large intestine. It may be sporadic, endemic, epidemic, acute or chronic. In this article we have only the chronic form in view.

The symptoms of chronic dysentery are considerably modified from those of acute dysentery. The stools are made up of serous exudation and slime ; blood is more rarely met with than in the acute form, there is sometimes puriform matter, with feculence generally unformed. The tenesmus, or painful straining in the act of defaecation, is much modified, and is rather replaced by a painful sensation of weight towards the termination of the large intestine and round the anus. The belly is painful to the touch and retracted. There is

little or no fever. The appetite may be either normal, exaggerated, or diminished. Multiple abscesses of the liver frequently supervene, and though the disease may last for months and years, if not checked it leads to a state of cachexia.

Dysentery is a disease contracted in warm climates, and is very common in India and Africa, particularly among the Europeans. Unwholesome drinking water is one of the exciting causes, as is also bad and unwholesome food. There is no doubt but that malaria plays an important part in its production, but it is difficult to specify, as, though it is frequently prevalent in the same districts as malaria, this is not always the case ; for example, Guadeloupe and Pointe-à-Pitre are ravaged by paludean fevers, yet dysentery is hardly to be met with there. It reigns in an endemic form at Senegal, Cochin China, Mexico, India, Algeria, &c.

Of course the first indication to be followed in this disease is to quit the infected country, when it is possible, for exported Vichy waters will not be of much avail when the poisonous conditions which give rise to and keep up the disease are on every side.

The thermal treatment at Vichy has given some surprising results in many obstinate and long-standing cases. The large numbers of soldiers from Senegal and Algeria treated at the Military Hospital of Vichy for this disease testify to the powerful effects these waters have upon checking its progress and restoring the patients to a relative state of health.

The waters must be taken in very small quantities,

and often it is found necessary to dilute them. While following the thermal treatment, special attention will have to be paid to diet.

The effects of the waters are generally somewhat slow, and it is only when the treatment is over that their utility can be fully appreciated.

C. *Constipation.*

Constipation (*con*, together ; *stipo*, I cram) is not in itself a disease, but a few words on this subject will not be amiss to close what we have to say concerning the complaints of the intestinal tract.

Constipation means, in a general way, infrequent evacuations, which are solid and deficient in quantity ; they differ in solidity according as to whether the constipation is more or less pronounced ; they often consist of hard concretions called scybala. The defæcation is generally more or less painful, and even sometimes impossible, these masses having to be removed by artificial means. Infrequency of defæcation alone is not a sign of constipation, the frequency of the evacuations often depending on individual peculiarity. A daily evacuation is not necessary for the maintenance of good health ; it is only when headache, feverishness, loss of appetite, &c., manifest themselves, or that the evacuations become difficult and painful, that interference becomes *necessary*.

We leave altogether the pathological causes of con-

stipation such as tumours, malignant growths, &c., to direct our attention to the general causes.

The principal cause is inertia of the large intestine. The peristaltic action of the bowels drives the faecal matters gradually towards the inferior part of the rectum, where they accumulate. Normally, the faeces should pass without difficulty by the contraction of the different muscles used in defaecation, but if from one cause or another these matters are allowed to accumulate in too large a quantity, the muscular power becomes insufficient, and after a certain time the rectum becomes more or less paralysed.

Sedentariness is one of the principal causes which bring on this inertia; opiates, &c., have the same result.

The indication of the Vichy waters is to give tonicity to the walls of the rectum so as to allow them to regain their normal functions, which will have to be maintained afterwards by certain hygienic rules as to diet and occupation as the case may call for.

The Vichy waters are rarely found unsuccessful in bringing about the desired result. The treatment should consist of ascending rectal douches, which must be taken daily or every two or three days according to the doctor's prescription. The duration of the douche will depend upon circumstances, from a few minutes to ten minutes or a quarter of an hour.

CHAPTER VIII.

UTERINE DISEASES.

Metritis.

CHRONIC metritis, or chronic inflammation of the womb, is unfortunately one of the most common complaints to which women are liable. The inflammation may be exclusively limited to the neck of the uterus, or the whole body of the uterus may suffer at the same time. As the thermal treatment is the same in both cases, we shall more particularly describe those symptoms which are observed in the first case as being more evident, easier to explain and easier to recognise, the metritis of the body of the uterus only presenting signs and symptoms more or less vaguely characterised.

The symptoms accompanying this morbid state of the uterus may be briefly described as follows : The volume of the organ is increased, it is more easily felt through the abdominal walls, the neck is indurated, and the orifice dilated in an irregular manner ; it is usually rough and granular, presenting erosions or ulcerations, and is generally very painful to the touch

there is an abundant discharge (leucorrhœa) of glairy or purulent matter. A constant pain prevails in the lower part of the abdomen and back associated with or distinct from severe uterine pain which in some cases acquire great intensity. The urinary functions are reacted upon, and the sufferer has a constant desire to pass water. A like necessity to defæcate is constantly felt.

As would be naturally expected, menstruation is seriously affected ; the periods are generally irregular and accompanied with severe uterine pain. In these intervals it is not rare to see copious uterine hæmorrhages. As a general rule the periods last longer, and come closer together, so that the poor patient complains of being constantly bathed in blood.

Walking and exercise of any kind may become impossible, and the recumbent position, whether in bed or on a sofa, is all that the patient can bear, or that brings any relief.

We have described a chronic attack of moderate intensity ; all these symptoms exist in every case in a greater or less degree.

It is easy to understand that the general health soon becomes affected in its turn. The digestion is impaired, giving rise to dyspepsia, hysteria, sickness or vomiting, headache, insomnia, &c. These symptoms may become so prominent as to mask the real disease. The patient becomes emaciated, her life is a burden to her, all cheerfulness deserts her and nervous irritation becomes excessive.

Manifold are the causes which bring about this disease. It may succeed to an acute attack of metritis, or be from the commencement chronic. In this last case it is impossible not to recognise the importance of general predisposing causes, which give rise to a special group designated by certain authors by the name of "constitutional metritis." Under this group may be placed those cases of metritis occurring in subjects of a weak constitution; affected with chlorosis, chloro-anæmia, scrofula, or tuberculosis; women who have borne a number of children; the result of a too prolonged lactation, unhealthy hygienic conditions, &c.

The predisposing local causes are more important, and are principally due to the strain put upon the uterus, when the confinements have been numerous and at short intervals, by displacement of the uterus, &c.

Certain occasional causes must also be mentioned, such as fatigue and a want of temperance in the intimate relations between man and wife.

Chronic metritis is a very long and troublesome disease, and, abandoned to itself, will fatally lead to ruined health. Before entering upon the explanation of how the waters operate in this disease, we would say that both medicinal and surgical treatment have generally to be resorted to, and that it is only after such treatment that the patients generally come to these springs. Their efficacy is recognised by the whole of the medical profession, who invariably send their patients, particularly in the latter stage of the disease, to drink the

mineral waters ; they frequently come when every other treatment has failed, and when the symptoms have been going from bad to worse ; they leave with the symptoms considerably ameliorated.

The erosions and ulcerations of the neck of the uterus cannot be cured by the Vichy waters, which have no cicatrising influence ; they appear rather to oppose the cicatrisation of wounds in general. While the waters would thus relieve the general symptoms they would aggravate, or at best leave *in statu quo*, those lesions which as long as they last keep up the malady. They must therefore have other and special treatment. An immediate surgical treatment before recourse is had to the waters is best to secure the cicatrisation. The means employed are usually cauterization, whether by the use of the thermo-cautery or by the nitrate of silver. Should the erosions and ulcerations still exist when the patient comes to Vichy, the surgical treatment may be continued, or replaced by douches of carbonic gas, which exercise a most salutary influence upon them. The mineral water has much more efficiency when this result has been obtained.

The first action of the waters is on the digestive organs, which they stimulate. The appetite improves, the digestion becomes more regular, and all the painful and trying symptoms which are to be met with in dyspepsia, and which are so common with patients affected with almost any uterine complaint, are alleviated, and tend to disappear. Consequently the

nutrition becomes more complete, strength returns, the countenance recovers its colour, and the patient recommences to put on flesh. At the same time a great improvement takes place in most of the other general symptoms. The bladder becomes less irritable, micturition is less frequent, constipation still is the rule for some time, but the pain in defæcation is entirely, or almost entirely, removed. The wind in the stomach, the distension of the belly by gases, the sick sensations are all done away with.

No wonder, if with such a relief from suffering, the mental condition of the patient improves at the same time. Instead of the despondent, woebegone, and miserable look so common while the disease is at its height, no sooner do they get under the influence of the thermal treatment than their cheerfulness returns, and their irritability of temper, insomnia, &c., disappear.

The severe lumbar and inguinal pains are also amongst the first symptoms to disappear under the thermal treatment, which exercise here the same sedative action which they constantly exercise against pain, when symptomatic and not in the diseased organ.

The piscine is most applicable to this part of the treatment; its influence appears much more active than the ordinary mineral bath. The patient should remain some time, from two to five hours, in the piscine, according to the particular case. Some cases, however, would derive harm instead of good from these baths. Very nervous women cannot support them,

and they are in general contra-indicated under the same circumstances as those in which the Vichy waters are contra-indicated.

The patients are soon able to move about with greater ease. Those who were confined to their beds are able to take drives, and those who could do little more than crawl are able to walk with comfort.

However, in the midst of these changes, so favorable while the strength returns, and the more painful symptoms cease, there is one symptom which holds its sway—the leucorrhœa, the flow continuing with the same abundance and of the same quality. It is rare that this symptom is at once and manifestly modified by the thermal treatment; it is incontestably the one symptom of all others which the Vichy waters have the most difficulty in modifying, no matter in what manner they be administered. It is only after the waters have caused their effects to be felt over the system in general, and the disease is in a fair way of being cured, that the leucorrhœa in its turn shows a tendency to decrease and disappear. Thus, while not acting directly on this discharge, the thermal treatment indirectly tends to suppress it. The congested state of the uterus is manifestly modified, and it is easy to note how the neck of this organ decreases in volume.

We have already remarked that the thermal treatment is counter-indicated in acute cases, or where there is acute inflammation present.

There are also a certain number of women affected or threatened with hysterical disease with whom the

malady will probably only increase under this treatment.

The principal difficulty in diseases of the uterus is to enable the patients to support the thermal treatment. Many women, constitutionally irritable, become still more so, owing to their prolonged sufferings and debility. The waters in many cases increase their nervous excitement. They may give rise to cardialgic pains, anorexia, insomnia, and hysterical attacks. The waters, therefore, should be given with caution and in small doses.

From the foregoing remarks it will be seen that the thermal treatment appears to have but a very slight action upon the alteration of the uterus itself, but that its influence is considerable in restoring the general health of the patient.

Another influence has to be exercised upon the patient other than that of the mineral waters. The physician must use his moral influence to cheer and comfort the patients ; he must encourage them to keep up their spirits and to resist the depressing effects of their malady. The patient on her side must be submissive, and however disagreeable certain examinations must be to her—and no one better than the physician knows what they cost to sensitive women,—she must understand that if not necessary it would not be asked for, and facilitate the medical man's work by not raising groundless objections to a necessary though unpleasant duty.

The mineral baths should not be too rich in mineral

water; one quarter of mineral to three quarters of spring water is ample, so as to excite as little as possible. The temperature must not be too high, for fear of weakening still more an already enfeebled system. They should be prolonged, and it is for this reason that we have spoken in the first place of the piscine, which will almost always replace advantageously the ordinary bath.

Douches on the loins and in the hypogastric region have proved useful. M. Durand-Fardel recommends the ascending douche at a temperature of from 15° to 20° externally, generally upon the anus, or the perinæum and the vulva, sometimes allowing a little mineral water to penetrate into the rectum, rarely into the vagina. There is always a fear of too much stimulation with this treatment, as applied to the malady we are discussing.

One thing that patients affected with this disorder should make up their minds to before leaving their homes, is that the three weeks' treatment applied to many other diseases which are treated at Vichy is altogether insufficient for them, and that from six to eight weeks is what is required to do permanent good. At the end of these weeks the improvement may be so great that the patient may think herself nearly cured—in some cases they may be so, but in the majority more time is necessary.

We have purposely refrained from speaking of the displacements of the uterus frequently to be observed during the course of this malady, whether produced

by it or pre-existing, as their treatment is rather surgical than medical. Pessaries, &c., have generally to be employed, and while the waters may give tone to the organ by improving the general health, they are insufficient of themselves to bring about a cure.

In the same manner we have not spoken about the constipation which is so often to be observed. Its treatment will be seen in the article under this heading.

All uterine tumours, fibroid or others, appear to derive very little benefit from the Vichy thermal waters. For some it is absolutely contra-indicated; cancer, and in general all malignant growths, far from improving, will only get worse under this treatment.

CHAPTER IX.

DISEASES OF THE LIVER.

A. *Congestion of the Liver.*

THE mineral waters of Vichy have long since acquired a well-merited reputation in the treatment of a number of diseases to which the liver is exposed. It must not be supposed, however, that they are suitable for *all* the complaints which may affect this gland; cancer, all organic diseases, tuberculosis, and hydatids of the liver will derive no benefit from this thermal treatment.

The diseases of the liver which are most benefited by the Vichy water are chronic and passive inflammation, fatty disease, inflammation of the biliary ducts, gall-stones, hepatic colic, and in a general way hypertrophy of the liver.

M. Durand-Fardel, in explaining the general action of the waters in these diseases, says:

“The direct effects that the Vichy waters exercise upon these diseases may be explained perhaps by the facility with which the medicinal properties they contain approach the hepatic apparatus; one may say, in

fact, that the liver receives at first hand those mineral principles introduced into the stomach and seized upon by the absorbing vessels." Congestion of the liver is the complaint of all others affecting this gland which is the most easily amenable to treatment.

By the richness of its vascularisation and by the peculiar disposition of its blood-vessels, its double system of capillaries, and the activity of its circulation, the liver is very liable to become congested. But with congestion of the liver, as in congestion of the lungs and brain, the description of the congestion of an organ cannot be confined to the organ in question, but other morbid conditions have to be considered at the same time.

The congestion may be either *active* or *passive*. The active congestion is caused by an increase in the pressure of the efferent vessels, the portal veins. A copious repast, improper diet, digestive derangements in the stomach and bowels, constipation, abuse of alcohol and of ardent spirits, &c., combined or alone, may produce this state. It is also met with in the course of certain intermittent fevers, &c., of which we shall speak hereafter.

When the congestion is determined by an increased pressure in the efferent vessels, that is in the hepatic veins and vena cava, this passive congestion may be due either to disease of the heart, or of the lungs, or to the presence of some tumour impeding the flow of blood, but the usual cause is a mitral lesion.

Naturally the treatment will have to be modified,

and the case will be more or less complete according to the cause which has occasioned the congestion.

The symptoms are various and are rarely all present in the same case. The liver is enlarged and extends below the borders of the ribs and across the epigastrium, there is often tenderness on pressure. There is a sensation of oppression and fulness on the right side. The digestion may remain apparently normal or be attended with nausea, vomiting at times of bile and bilious diarrhoea ; the skin becomes sallow, sometimes jaundice coloured ; headache, drowsiness, and general depression are habitual. The congested condition of the liver induced in India and other tropical climates, as the result of high temperature, and malarious influence, may terminate in chronic enlargement. The bowels are generally constipated when this malady has passed into the chronic stage, the nervous system is more deeply affected, as shown by the increased depression of spirits, disinclination for effort of any kind, headache, giddiness, &c.

The most favorable time for employing the thermal treatment appears to be when the disease has already existed a few months, but not in long-standing cases. In other words, it must neither be too recent nor too chronic ; between four months' and four years' duration may be given as approximate extremes.

The treatment, is absolutely contra-indicated when any considerable amount of ascites is present. When there only exists a slight swelling of the ankles or feet, and when we believe the disease to be simple conges-

tion of the liver, the treatment may be followed, but the patient will have to be watched carefully.

When the congestion has been brought about by some derangement of the digestive organs, or by exposure in some tropical climate under the influence of the heat and malaria, the thermal treatment is all-powerful. It is worse than useless if it is due to some lung complication or other organic malady. It is therefore of primary importance that patients should discover the *cause* of their malady before setting out on a journey which cannot fail to cause them much disappointment if it should turn out that it has been taken uselessly.

So far we have always insisted upon the small dose that ought to be taken of the mineral water. In the case of the disease of which we are now treating this principle need not be followed ; on the contrary, large doses are necessary, from six to seven glasses daily when the digestive organs can tolerate it. It is necessary, however, to start with very much less, and patients will do well to remember that seven glasses are the maximum that can be taken at any time of the treatment. The Grande Grille and Hôpital suit most cases.

Douches and mineral baths will be employed at the same time, their number and duration as well as strength being fixed according to each individual case.

B. Hepatitis.—Inflammation of the Liver.

We have more especially in view in this article the hypertrophy of the liver, the result of paludean intoxication.

Chronic inflammation of the liver is usually contracted in tropical climates. The symptoms are rarely all to be found in one and the same case, but those most usually met with are a dull, heavy, bearing-down sensation on the right side, which is more or less sensitive to pressure. Frequently this pain will also affect the right shoulder, always jaundice in a mild form, and sometimes very pronounced.

The liver becomes considerably hypertrophied ; by its displacing to a certain extent the right lung and occasionally the heart also it may give rise to trouble in the respiration and in the circulation.

The digestive functions are disturbed ; loss of appetite, dyspepsia, diarrhoea or constipation are the rule. The faeces and urine have characteristic features when jaundice is marked.

The principal causes which may bring on inflammation of the liver are exposure to heat and to changes of temperature—both of which have a large share in what is called tropical influences—irregular habits of life and spirit drinking, and different malarious influences. The chronic form generally succeeds to the acute form of this disease.

Now and again acute symptoms will develop them-

selves, and as long as they last the thermal treatment should not be attempted.

The same treatment as that indicated for congestion of the liver is often applicable here. It has to be varied according to the period at which the disease has arrived and various other conditions which the physician will note, but as a general rule pretty large quantities of the water will be found useful. Douching in the hepatic region and mineral baths are all indicated, and assist each other in the treatment.

As soon as any acute symptoms occur it will be at once necessary to modify the treatment or very serious and even fatal accidents may ensue.

The waters act in the first place on the general health, improving the appetite and assisting the digestion. It often happens that no appreciable benefit is derived until after the patient has left Vichy. He has no reason to be discouraged, for it has been remarked that the improvement is generally long in manifesting itself, but once begun it becomes speedily marked.

C. Biliary Lithiasis.—Gall-stone Colic.—Hepatic Calculi.

The production of gall-stones is one of the most common lesions to which the human race is subject. They may be formed in any of the parts where the bile remains for some time, either within or without

the liver, but they are usually formed in the gall-bladder or the cystic and common duct.

They vary in size from fine gravel to calculi, which may exceed the size of a large nut or even that of an egg. The largest are generally single; the smaller calculi are usually numerous and wedge shaped. They vary much in colour according to their composition, brown, yellow-green, and white being the most usual. They are of a very low density, but somewhat more so than water before being dried. They are usually soft, and can be moulded by the fingers.

Age appears to have a very great influence on the production of gall-stones, and until puberty they are rarely met with. Women would appear to be more liable than men to this complaint, and it is particularly the affliction of heavy eaters who take but little exercise.

The real cause of their production is very obscure, but it is generally admitted that a certain predisposition (diathesis) exists among some people to their formation, and that arthritic, gouty, and rheumatic subjects are more exposed to contract them than others. No doubt can exist that there is a close connection between urinary lithiasis and biliary lithiasis.

It frequently happens that the existence of gall-stones gives rise to no discomfort during lifetime, and is only discovered after death in the gall-bladder.

It is when the stones begin to leave the gall-bladder and escape into the cystic and common duct

that symptoms of gall-stone colic arise. These symptoms might be divided into four principal groups if we were writing a medical treatise, but for the purpose we have actually in view it will simplify matters to consider all the symptoms together, remarking merely that they are not all to be seen simultaneously, and that they depend upon the stage of the disease and also upon its duration.

Hepatic colic is the most frequent of any of the accidents to be observed. It would serve no purpose to explain its mechanism other than by saying that the stone passing through ducts too small to allow of its free passage, forces its way and causes an irritation by its rough surfaces, which varies much in intensity. The disease often begins with a dull pain near the liver, with vomiting, rigors, and elevation of temperature, or quite suddenly, a severe pain on the right side comes on, of a shooting kind. The pain irradiates in different directions, and more particularly to the right shoulder. It is very intense, and may give rise to delirium in nervous persons or to hysterical attacks in women. The patient is in such agony that he cries out, and throws himself about in every position on the bed in his endeavours to obtain relief. These colics may last many hours at a time, after which there is generally a period of calm.

Vomiting is rarely absent. Sometimes the food alone is thrown up, but generally a vomiting of bile follows. Jaundice usually exists during the attack, but not always, its intensity varying according to the

form of the calculus, whether it blocks up completely the passage or allows room from its irregular surface for the bile to circulate. The attack generally ends very suddenly,—as soon as the gall-stone has passed into the duodenum.

When the gall-stone reaches the intestines it is commonly evacuated with the faeces.

It is not always easy to form a correct diagnosis of the disease, as many other things may give rise to hepatic colics. Until a gall-stone has been discovered in the stools a certain doubt, very slight perhaps, may always exist upon the true nature of the malady.

It is incontestable that the Vichy mineral waters constitute a remarkably efficacious treatment in hepatic calculi, but their actual mode of action is far from being solved. It has been suggested that they dissolve the calculi by the modifications they occasion in the composition of the bile. This is by no means proved, and no chemical data can be produced to substantiate this theory. The principal substances met with in biliary calculi are cholesterine, amorphous or crystallised, in addition to which are the different colouring matters of the bile and the calcareous salts. Chemistry teaches us that alkalies will not dissolve the cholesterine, and the Vichy mineral waters are remarkable for their alkalinity.

The more easily accepted theory is that given by M. Durand-Fardel, who thinks that the principal action of the waters is to accelerate the flow of the bile, by causing a special activity in the hepatic secre-

tions, by giving renewed tonicity to the excreting organs, and possibly in causing a certain modification in the bile, but not such as had been supposed by those who hold to the theory of the calculi being dissolved.

There are certain indications to be followed in this treatment which may be summed up as follows:

1st. To calm the pain. 2nd. To facilitate the expulsion of the calculi. 3rd. To prevent the formation of fresh calculi.

The first indication cannot be obtained from the Vichy waters. We have to address ourselves to general therapeutics and have a number of agents at our disposition which will alleviate the suffering, of which it would be out of place to treat in this work, which has but one object in view,—to show how the Vichy mineral waters operate.

The second indication, the facilitating of the passage of the calculi, is most efficaciously carried out by the treatment with these mineral waters. The colics generally become more frequent while under treatment or immediately after the patient has left Vichy. Sometimes the colics become so severe and so continuous that it requires much perseverance and patience on the part of the sufferer to continue the cure, and on the part of the physician great tact and care in the direction of the treatment.

It may be asked, How can the pains increase in intensity and frequency, and the thermal treatment be termed efficacious in their cure? The explanation is

very easy. We have already explained how the pain is caused by the passage of the calculi through ways which will not allow of their easy exit. They may remain a long time in the gall-bladder or pass slowly and with more or less difficulty into the intestine. The Vichy waters *hasten* this passage and cause more stones to pass through in a limited time; hence the increase of pain; this pain is generally but more or less momentary, and the sufferer has a long respite afterwards. Instead of being discouraged, therefore, the patient should consider these pains a good omen, as being a sign that the waters are acting, and that shortly the suffering will be much abated if not entirely done away with.

The third indication—to prevent the formation of fresh calculi—is also fulfilled, but in a lesser degree than the former. Thus these waters cause an increased flow of bile that facilitates the passing of the calculi which so to speak, it drives out, causing large calculi to pass, whose passage would otherwise be either impossible or very much more difficult; by the modification it causes in the consistency of the bile, and by rendering it more fluid it becomes an obstacle to the production of fresh calculi.

The treatment consists of mineral baths which should not exceed twenty minutes to half an hour. Pretty considerable quantities of the waters must be taken,—from five to seven glasses. The Hôpital or Grande Grille is that most commonly employed. Douches are generally indicated, particularly the

ascending douches, as constipation is the rule. Great care must be taken in the treatment, the effects having to be closely watched. Should acute colics supervene the treatment must be stopped for some little time, and the doses will be smaller when the treatment recommences.

Generally speaking the treatment should be somewhat prolonged, say for thirty or forty days. It is necessary to return to Vichy the next season, even if the hepatic colics have not returned, on the principle of prevention being better than cure.

CHAPTER X.

DISEASES OF THE URINARY ORGANS.

A. Renal Lithiasis.—Gravel.—Nephritic Colics.

By gravel is understood a deposit in, and escape from, the urinary passages of gritty particles with the urine. Acid urine, leaving a red brickdust deposit along the side of the vase, is not sufficient to constitute gravel,—the deposit must be such that the finger can recognise its gritty character.

These concretions, formed by the deposit of one or more of the solid constituents of the urine, may be of all sizes and dimensions. The smallest are called sand or gravel, the larger ones, which may be as large as a fowl's egg, are termed stones. These deposits may commence by minute concrete particles and as the malady goes on gradually increase in size, uniting and becoming calculous.

In its first form it often constitutes simply an inconvenience, and it is not rare to see people pass large quantities of sand and gravel, sometimes even small calculi, without feeling either inconvenience or pain. This is no reason, however, for neglecting the disease,

which may culminate in agonising renal colics ; and various diseases arise in the urinary organs by the inflammation occasioned by the gravel, &c., such as pyelitis (inflammation of the pelvis of the kidney), hydronephrosis (dropsy of the kidney), &c.

Usually but one kidney is affected. The urinary secretion is diminished as long as calculi block one of the ureters. Should a stone penetrate both of them at the same time the secretion would be totally suspended until the stone passed into the bladder. The bladder may retain the gravel or stone for an indefinite time, an important fact to bear in mind, the treatment being thereby influenced, as will be shortly explained. This tendency to retain the gravel, when it exists, increases as one advances in age by certain anatomical changes which take place in the bladder, some of the fibres of its muscular coat becoming hypertrophied and forming what are termed columns, that is, certain depressions are formed into which the gravel falls, and from which it is with difficulty dislodged by the simple act of micturition, easy enough when the bladder presented its normal smooth appearance.

Gravel is most commonly formed of uric acid or of urates ; it is very hard and of a reddish colour. Other varieties, however, may be met with ; they may be formed of oxalate of calcium and are then of a brown colour ; or of ammoniaco-magnesian phosphates, in which case they are white and very friable. These concretions may be simple or complex, and when

they have been forming for a long time, consist of stratified layers of varying composition.

Thus the uric acid, the urates of soda, of lime, of ammonia, the phosphates of lime, magnesia, and of ammonia, which are normally to be found in the urine, may be precipitated under certain circumstances ; but other principles not normally present may also appear under decomposing influences or by a transformation process, and be precipitated in the same manner.

The same causes which produce dyspepsia are frequently productives of lithic acid gravel, such as too generous diet, insufficient exercise, the too free indulgence of fermented liquors, the impaired conditions of the functions of the skin, and in fact all causes capable of augmenting the quantity of uric acid ; indeed everything tending to interfere with the normal nutritive changes of the system and which diminishes the solubility of the uric acid, may give rise to this malady.

Endemic causes connected with climate and the nature of the drinking-water must also be noted. The frequency of gravel in England, Holland, and certain other localities has been ascribed to this cause.

Hereditary predisposition, and many slight or serious organic diseases will give rise to gravel. The urinary lithiasis is frequently united to the gouty diathesis ; it appears to be somewhat allied to rheumatism also.

We have remarked that the passage of uric acid crystals or gravel frequently causes no subjective

symptoms. Sometimes, however, it gives rise to, or is accompanied by, both general and local disturbance and function.

The general symptoms are those of dyspepsia, namely, flatulence and heartburn after meals, eructations, headache, muscular cramp, depression of spirits, and a sense of malaise. There is usually some degree of lumbar pain, generally restricted to the side affected, spreading more or less to the front of the body and down towards the groin or bladder. The pain is apt to be aggravated by exercise, especially by carriage exercise, and is liable on such occasions to become very severe. Micturition is frequent and often causes pain.

When the urinary concretions pass into the ureters, particularly those which are too voluminous or which from their rugged edges are not able to be easily evacuated, they give rise to renal colic. This colic may be brought on by some violent movement or by the action of the mineral waters taken for the cure.

The attack begins by sharp pain, limited in the first place to the side affected. In a short time the pain becomes agonising and radiates towards the ureter, bladder, urethra, testicle, and lower extremities. The patient twists himself about in every position in his endeavours to obtain some relief. The bladder is emptied with difficulty and pain, only a few drops escaping at a time, the urine becomes cloudy and sometimes contains blood. The attack may stop here or be reproduced many times, thus lasting for hours,

or even days. It is without exception, when the attack takes the severe form just described, one of the most painful maladies that exist. After the attack, and independently of the attack, the patient has a painful sensation of weight and discomfort in the lumbar region.

The nephritic colic is but one part of the malady, and the treatment must not only be directed to calming the pain, but also to removing the causes which give rise to it. To do this it is necessary to get rid of the gravel, and to prevent fresh gravel from forming.

The thermal waters of Vichy have no equal in bringing about this twofold object, and we shall now explain their mode of action and how they must be administered, adding a few words on the diet, &c., which must be followed.

One of the first effects of the waters is in general to render the urine more clear, and to get rid of the sediments and sand if they exist. Many people affected with gravel cease to have any fresh gravel formed by simply using the exported Vichy waters.

The first action of the waters is followed immediately after by another of an essentially calming nature, the pains in the kidneys are soothed, and the unpleasant sensation of weight in the lumbar region is removed.

Gravel composed of uric acid is frequently completely cured after one or two seasons at Vichy, if the patient continues to use the exported waters when he returns home and follows a proper *régime*.

The radical cure of gravel, however, is not very

usual unless it be the result of accidental causes. The special constitution of the patient, his hygienic habits may be a constant cause of perpetuating the malady. The waters, however, even in these cases are of great utility; they are the means of preventing an acute attack of gravel, and diminish the intensity of all the minor symptoms of the disease. Renal colic is almost sure to subside after treatment by the Vichy waters, but at the beginning of the treatment they may be the means of giving rise to these colics by forcing the gravel to be eliminated. These colics are produced in the same manner as the hepatic colics which we have already described, and instead of alarming the patient should on the contrary cheer him, as they are a proof of the efficacy of the waters. We by no means wish to imply that they are a necessary result of the treatment; in many cases they will not arise, but it is as well that the patient should know that they are not rare.

It is admitted by most doctors that the mineral waters tend to destroy the gravel already formed, and to prevent the formation of fresh gravel, at any rate if the gravel consist of uric acid. We do not believe in their efficacy in attacking stone or gravel of any size; they at most prevent the stone from increasing in volume, and the only treatment for stone when it becomes troublesome is a surgical operation, which consists of crushing the stone and then washing out the fragments by repeated injections, or removing it entire by cutting down upon it. We refrain from

discussing the surgical treatment as being foreign to our subject ; but after the stone has been removed, the thermal treatment is indicated to prevent fresh calculi from being formed.

The mineral waters act by their alkalinity. We know that a liquid rendered alkaline by the bicarbonate of soda exercises a dissolving action upon uric acid dust, and that this action increases in proportion as the dust is more minute in size ; this is proved by chemistry, and gives rise to the following theory :—If an alkaline liquid tends to dissolve uric acid, it should at any rate prevent its formation if introduced in sufficient quantity into the system. The bicarbonate is eliminated by the urine which stagnates for a longer or shorter time in the bladder. The bicarbonate is evidently more concentrated in the urine than in the blood. If it comes across any inert bodies in its passage through the urinary system, such as gravel or stone or even pus, some chemical action should arise from its alkalinity. Any fine sand should be entirely dissolved, while gravel may or may not be attacked according to its size, and stone probably remains absolutely unchanged. Even a very slight decrease in size in gravel may be of immense service by permitting perhaps to pass through the urinary passages that which by having a volume slightly too big could not previously pass.

The action of the waters therefore upon gravel formed of uric acid is certain if it be in very minute particles. How gravel of other composition is

chemically affected is not so easy to prove ; in any case the action of the waters is much more limited in the case of gravel other than that composed of uric acid.

By augmenting the urinary secretion the waters exercise a mechanical action. More urine is secreted within a given time ; consequently pressure in the urinary tract is augmented, and more particularly in the kidneys and ureters. The foreign bodies that may stand in the way of the urine receive this pressure direct and force the passages to dilate, and thus let them pass.

The Celestins springs are those most commonly recommended for this complaint. When they are found to be too exciting or too irritating those of the Grande Grille or l'Hôpital must replace them. The quantity may vary from three to six glasses daily.

When the patient has difficult or painful micturition or is suffering from a more or less continued pain in the kidneys, the treatment must be followed with precaution, for the renal pains will increase in intensity if the doses be excessive.

Douching in the lumbar region is to be recommended unless there are special contra-indications ; but it must be instantly ceased if nephritic colics become imminent.

The three weeks' treatment is entirely inadequate to arrive at a satisfactory result. If the patient can dispose of his time he should remain until the urinary organs begin to show signs of being saturated. When

he leaves he must continue to drink the exported waters, giving them up for a fortnight or a month now and again, and then beginning afresh. One or two successive seasons are invariably necessary.

The diet must be somewhat severe. Good living, rich wines, beer, and alcoholic liquors should be avoided. Reasonable exercise, when possible on foot, is to be recommended.

B. *Albuminuria.—Bright's Disease.*

Albumin is a common morbid constituent of urine, either temporary or permanent. Temporary albuminuria may be artificially produced by the ingestion into the stomach or by subcutaneous injection of raw albumen of egg; and it sometimes results from derangement of the digestion, due to the use of indigestible articles of food. It is often but one of many symptoms of a pathological condition. It is met with in various heart complaints accompanied with asystolë, that is to say, with insufficient contractions of this organ, by which the pressure in the venous blood-vessels is increased and that of the arteries diminished. It is to be met with frequently in certain eruptive fevers, scarlet fever, typhoid fever, smallpox, measles. It is common during pregnancy; it may also be brought on by the abuse of diuretics and irritating substances, such as turpentine, copaiba, alcohol, cantharides, &c.

Albuminuria may consist of serum albumin, oleine ; it is then termed *true albuminuria* ; or of some other albuminous body without serum albumin, when it is termed *false albuminuria*.

In true albuminuria there is always some change either in the circulation through the kidney or in the structure of the kidney itself. In false albuminuria the albuminous body passes out through the kidney without there being any alteration either in its circulation or structure.

Some regard the alterations in circulation which produce albuminuria as of two kinds : increased pressure of blood in the renal arteries, or increased pressure in the renal veins. Experiments seem to show, however, that increased tension in the renal arteries does not produce albuminuria, and that the only change in circulation which will produce it is increased pressure in the renal veins, *i. e.* congestion of the renal veins. This congestion may be produced in many ways : a cold bath may cause it, or a varnish applied to the skin, when not only are the cutaneous functions diminished or entirely suppressed, but visceral congestions are a necessary consequence.

The structural changes in the kidney which cause albuminuria are acute and chronic inflammation, waxy degeneration and cirrhosis.

Persistent albuminuria may be either acute or chronic, according to the form of disease of which it is symptomatic, and the acute forms may almost all pass into the chronic stage. Some are chronic from

the very first, such as in gouty and diabetic patients, and in Bright's disease. We will take Bright's disease as a type of chronic albuminuria.

Bright's disease comprises three distinct diseases of the kidney : 1st, an *inflammatory affection*, affecting the tubules, or the stroma, or both ; 2nd, the *waxy or amyloid affection*, originating in the vessels ; 3rd, the *cirrhotic or gouty affection*, originating in the fibrous stroma.

The most common of them all is the inflammatory affection, to which we shall confine ourselves more particularly.

Bright's disease is a general disease of the system, and is not due to the diseased state of the kidneys, which succeed and do not precede the disease. To describe the anatomical changes which take place in the kidney would oblige us to go into very minute anatomical and histological descriptions which would prove of no interest to the general reader ; we shall therefore at once pass to the causes which may give rise to this disease.

Cold is the commonest cause in the adult. It acts especially on those who have been exposed to its influence whilst perspiring ; febrile exanthema, alcoholism. Certain diatheses predispose to it : rheumatism, gout, &c. Malaria must also be considered as predisposing to Bright's disease. An injury is sometimes sufficient to cause it.

This disease is a very serious one ; little by little it undermines the constitution, every organ is affected,

the blood becomes modified in its composition, and the number of red corpuscles decreases.

The disease rarely declares itself suddenly ; usually the commencement is insidious and slow, and the disease cannot be readily recognised. It is generally chronic from the commencement, and those cases in which it is said to come on suddenly are probably cases where some acute attack has taken place during the course of the disease, which previously had not been recognised or suspected.

More commonly for some time past the patient has presented a number of symptoms appearing to be insignificant in themselves, but of which the unrecognised origin has often given rise to mistakes in diagnosis. Severe headaches, a frequent inclination to micturate, slight epistaxis (bleeding from the nose), palpitations, painful cramps, shortness in breathing, a ringing in the ears and slight deafness. The sight is affected, the skin becomes dry, sometimes itchy ; a creeping sensation in the fingers, a feeling as though the fingers were dead ; deranged digestion ; all these symptoms, either fugitive or tenacious, may appear and disappear during many months, before one great symptom appears—the œdema. During all this time there may be some acute attacks, more or less limited to one of these symptoms, an attack simulating asthma, an intense cephalalgia; palpitations and great shortness of breath simulating some organic heart disease ; sickness which might lead one to suppose some malady of the digestive organs ; œdema of the face or extremi-

ties ; eventually these attacks lead one to suspect the real complaint, and often to consider that its origin has been acute from not having observed the milder symptoms.

The diagnosis is, therefore, often difficult, but it can be made with certainty by an examination of the urine. We shall have to enter somewhat into details concerning some of the symptoms, but the composition of the urine will occupy us in the first place.

The composition of the urine and its quantity vary, according to the period of the malady at which it is examined.

In the acute form it is diminished but remains acid ; from 1200 to 1800 gr. per twenty-four hours it falls to 200 or 1000 gr. The urea falls from 30 gr. to 10 or 20 gr. ; the density is augmented ; instead of 1018 it varies from 1025 to 1047. The other salts vary in a less degree. In the chronic state the quantity of urine may be much in excess of the normal or below it—the density is much below the normal, averaging from 1004 to 1015. In both these phases of the disease there is generally an excessive frequency in micturition, which sometimes, and more particularly with women, is painful. Water may be passed as often as twenty times in the course of twenty-four hours, and perhaps not more than a tablespoonful at a time. There are deposits in the urine of tube casts, traces of blood, &c. Albuminuria exists in variable proportions, and may momentarily disappear during the intermediate stage of the acute and chronic form.

The heart is constantly hypertrophied, particularly the left ventricle. The blood is much modified in composition, its albumen is diminished about 50 per cent., while the urea is considerably increased, instead of 0·016 being as much as 0·070 or 0·084. After some time the red corpuscles diminish, which occasions the peculiar characteristic paleness of those affected with this complaint. Not only is the skin white and pasty-looking, but it becomes dry, and resists every effort to make it regain a certain degree of moisture.

Œdema is rarely wanting; it may become general and constitute what is termed anasarca. It more commonly commences in the face; the patient notices that his eyelids are swollen in the morning; they become all right during the day, but the following morning they are again heavy and swollen. The face also becomes swollen; the ankles, legs, and thighs are attacked in their turn. The anasarca may be complete in a few weeks, or take months before it is generalised.

The sight becomes affected, the vision is indistinct, and absolute cecity may supervene.

The disease is often complicated with a severe form of dyspepsia, accompanied by constant vomiting, and dysenteric diarrhoea. There is functional derangement of the liver, and amongst other complications may be mentioned ascites, hæmorrhage, &c.

We have been obliged to be as brief as possible in describing the symptoms. It would be necessary to write a separate volume on this subject to fully explain

all the symptoms and the pathological changes which the different organs, and particularly the kidneys, undergo during the course of the disease, but we think we have said sufficient on this subject to convince the reader of the gravity of the complaint, and to enable him to understand in a general way the course of the disease, and to follow the action of the thermal waters which we are now about to describe.

The first indication is to assist the general nutrition. We have frequently explained how the mineral waters produce this result.

At the first period of the disease the waters are contra-indicated, as the two kidneys are gorged with blood, and would only be further irritated and inflamed if an extra strain were put upon them to get rid of the bicarbonate of soda and their activity increased by these waters.

It is when the disease is fully established, but not yet chronic, when in the intermediary stage between the acute and the chronic period, that the waters are particularly indicated and have most influence. Taken before this period the waters are dangerous ; they will increase the albuminuria, and very likely produce haemorrhage. Taken after this period they are only palliative ; but taken during the intermediary stage, when the kidneys, although still inflamed, have not the same abnormal activity, when the urine has once more become nearly normal and the albumen has notably decreased, the thermal waters may produce a complete cure.

The disorders already produced may be repaired, and those which are to be feared may be prevented. The waters may be employed both internally and externally. The functions of the skin will be stimulated by them, the urinary secretion increased, and thereby the œdematosus state of the whole system will tend to disappear. At the same time, the digestion and assimilation being rendered more easy, the general nutrition in its turn will be favorably influenced, and last, though not least, the morbid condition of the kidneys will speedily be rectified and the organ regenerated.

Most patients are recommended to drink of the Celestins Springs, but in many cases these springs will be found too exciting, and may be advantageously replaced by that of l'Hôpital, which has a more calming effect, and a marked action on the digestive organs.

The baths must be employed with precaution as well as the douches. In advanced dropsy they are dangerous.

Neither for the quantity of water to be absorbed, nor for the number of baths to be taken, can any definite laws be laid down; the nature of the malady, its numerous complications, the antecedents of the patient, period of the complaint, have all to be carefully weighed and considered, for an intemperate use of the thermal treatment may easily lead to fatal results.

It will frequently be found necessary to combine the use of general therapeutical agents with the thermal

treatment, and attention will have to be paid to hygiene and diet.

C. *Vesical Catarrh.—Chronic Cystitis.*

Chronic cystitis, that is chronic inflammation of the bladder, is a complaint which is most common in advanced life, but it is occasionally to be met with in youth.

Vesical catarrh is often idiopathic or results from acute cystitis. It may be developed by general or by local causes. It is mostly the result of stricture of the urethra, or congestion of the prostatic gland. It is also brought on sometimes by an acquired habit of retaining the urine long in the bladder. Professional gamblers and those whose professions necessitate assiduous work, are apt to neglect emptying the bladder, and thereby contract vesical catarrh. It may arise from the presence of calculi, or of growths in the bladder, from paralysis or disease affecting a nervous centre, such as chronic myelitis.

The inflammation of the neighbouring organs may react upon the bladder and inflame it in its turn ; it will thus be seen frequently to accompany diseases of the uterus and of the urethra. Certain idiopathic conditions must also be mentioned, such as the presence of gout, rheumatism, &c. There is also a special variety, of tuberculous origin.

The principal symptoms of this malady lie in the

nature of the urine passed and the manner in which micturition is effected.

The pain in passing water is very variable. When the disease has been of but short standing there is only a sensation of weight above the pubes and a slight pain at the commencement, and not at the end of this act, as long as the prostate is not affected.

Micturition is always more frequent, and a greater effort is necessary to void the bladder. Sometimes there is incontinence from an incomplete retention, and at other times there may be absolute retention.

The general health does not suffer unless the affection is prolonged or severe; in the latter case the digestive functions become deranged, there is loss of appetite and also loss of sleep from the constant desire to void the bladder; the patient loses flesh and acquires a cachectic hue.

The characters of the urine are of the utmost importance. At the earlier stage of the disease it contains but little mucus, which forms a cloud in the middle zone of the liquid, but as the disease progresses the urine becomes more cloudy, of a milky-white appearance, and glairy deposits form round the sides of the vase. The water the moment it is passed is either neutral or alkaline, but in any case it becomes alkaline very shortly afterwards. The smell is most offensive, being strongly impregnated with ammonia. These characteristics become still more pronounced after the urine has been voided for some time. Its density is usually augmented.

The Vichy waters are not indicated in every case of catarrh; when it is dependent upon a nervous affection such as chronic myelitis, or when it is of tuberculous origin, the waters are powerless to effect a cure.

Whenever chronic cystitis depends upon some obstruction or impediment in the passage of the urine, the first indication is to get rid of this obstacle by the means most appropriate to its nature. If it is dependent on stricture of the urethra, the canal must in the first place be enlarged. The waters employed after this operation will prove most beneficial. They are also particularly effective, and may render important service after the operation of lithotripsy, either to assist in expelling fragments and prevent the formation of new calculi, or in combating the effects of vesical catarrhs generally following this disease.

The bicarbonate of soda contained in these waters has a powerful action upon the mucous coat of the bladder. This coat is much inflamed in vesical catarrh, and the inflammation is kept up by the presence of mucus in the urine. The bicarbonate causes a slight irritation to the mucous lining, which may be termed substitutive irritation, and by its anti-putrid properties reacts also upon the composition of the urine which may injuriously affect the bladder.

In inflammation of the prostate the waters are generally contra-indicated until the primary affection is improved. When the catarrh is dependent upon

a gouty or rheumatic diathesis the waters will bring about some improvement, but will not cure.

When it is dependent upon a stricture that has been operated on, upon some foreign body that has been removed, or upon some complaint amenable to the Vichy waters, such as some affections of the uterus, a radical cure may be looked for.

It is necessary when prescribing the waters to beware of a return to the acute stage, particularly in the beginning of the treatment. Great caution and a regimen of small doses then become necessary in order to prevent the painful straining in micturition being followed by an impossibility of passing water.

The spring has to be determined upon with care. When the patient can support the Celestins' waters they are generally prescribed in preference to the other spring, but in many cases it is found to be too exciting, and recourse is had to the Grande Grille.

The quantity to be taken will vary in each individual case. With some as many as four or five glasses daily will not prove excessive, while in other cases small doses are necessary, as with all possible precautions the patient is liable to symptoms of strangury and pain in passing water.

After leaving the springs the patient should continue the treatment by the use of the exported waters, to prevent a relapse, which is very liable to occur.

Hygiene and diet hold an important place in the treatment. The patient should remain in a warm and

dry climate, avoid all chills, abstain from alcoholic liquors, and be sparing in the use of nitrogenous food. A milk diet may prove a most useful adjunct to the thermal treatment.

CHAPTER XI.

GOUT.

THE name gout (from *gutta*, a drop) is supposed to have originated in the idea of the dropping of a morbid fluid into the joints, and is of very ancient date.

Strangers from all parts of the world flock to Vichy to obtain relief from this complaint, which, with diabetes, are the two maladies most common amongst the patients visiting the thermal station; the dyspepsia, gastralgia, &c., of which many complain, and for the treatment of which they come to Vichy, being only symptoms of these diseases, as also some of the other complaints of the digestive and urinary systems.

Such being the case, we will give this subject special consideration. Gout is a perversion of the nutrition, which is shown anatomically by an alteration in the blood and by certain deposits in the smaller joints, and sometimes in other parts of the body; it is a general or constitutional disease, probably depending upon the presence in the system of an excess of uric acid, the complaint being in fact a manifestation of the lithic or uric acid diathesis, lithiasis or lithæmia.

It may be hereditary or acquired, and is characterised ordinarily by peculiar inflammation of the joints—*articular or regular gout*, attended with the deposit of urates in their structures, affecting usually and especially the smaller joints, and at first more particularly the metatarso-phalangeal articulation of the great toe, but afterwards extending to other joints. Similar deposits of urates may occur in other tissues in course of time, and certain organs of the body are liable to become the seat of functional disorders, or of pathological changes, during the progress of the disease—*non-articular or irregular gout*—while it is often attended also with general symptoms. Gout in the early part of its course is usually an *acute* affection, occurring in periodic attacks or “fits,” but subsequently it tends to become more or less *chronic* and permanent, though even then generally presenting exacerbations from time to time. The gouty diathesis may, however, be present without giving rise to any joint affection or other evident organic mischief (Frederick T. Roberts).

The immediate pathological cause of the gouty diathesis and its accompanying phenomena is somewhat obscure. By some the complaint is attributed to a certain morbid condition of the blood and secretions; this constitutes the *humoral theory*. Others attribute it to some functional disorder or organic change affecting certain systems of the body, and especially the nervous, vascular, or digestive systems; this is the *anti-humoral theory*. Dr. F. T. Roberts

attributes it to the presence of some special morbid agent in the system, and it is now universally admitted that this agent is uric or lithic acid which accumulates in the body in abnormal quantity. But this excess of uric acid would not be of itself sufficient to produce gout, for it often appears in an acute form in certain acute maladies or in a chronic state (cirrhosis, leucocytæmia) without there being the slightest manifestation of gout. Professor Bouchard, of the Faculty of Medicine of Paris, attributed less importance to the causes which bring about this excess than to the causes which retain it in the blood. These causes are the diminution of the alkalinity of the blood and the predominance of oxalic and lactic acids. The predominance of the acids facilitates the precipitation of the uric acid whether it be in a free state or in the form of urates. This morbid condition of predominance of acid is due, according to Professor Bouchard, to the fact that in gout the formation of the organic acids is exaggerated or their destruction too slow. It is another form of what this eminent Professor styles "nutrition retardante." We are entirely of the opinion of Professor Bouchard.

Dr. Garrod was the first to demonstrate the existence of uric acid in the blood of gouty patients. He indicated a very simple mode of proving its existence. A small amount of serosity is collected in a glass capsule; a few drops of acetic acid are then added to it, and a thread is suspended in it. Within thirty-six or forty-eight hours, if the liquid be not disturbed, uric

acid crystals will be found on the thread, if it be examined under the microscope.

This experiment proves that the uric acid is not in its free state in the blood, but in the form of a urate, which in the preceding experiment has been decomposed by the acetic acid. In the blood of healthy persons the presence of uric acid is so minute that it cannot be detected by any ordinary tests.

It has also been found in the fluid contained in blebs raised by blisters, provided they are applied at a distance from the seat of any acute gouty inflammation, in inflammatory effusions in serous cavities, and in dropsical fluids such as ascites.

While the uric acid is being formed in excess in the system it is excreted in a smaller quantity than normal with gouty subjects. Some authors had asserted that the urine was more charged with it, but Garrod conclusively proved the contrary. He tested the entire amount of urine passed in the twenty-four hours during an attack of gout, and found the quantity of uric acid to be but 0·25 gr. for this period instead of 0·50 gr., the normal quantity. In the intervals of the attacks this figure is much increased.

In chronic gout the uric acid in the urine is generally in very small quantity. Garrod in seventeen cases found the average to be below 0·6 gr.

Gout, or rather the gouty diathesis, is hereditary in about one half of the cases. It is much more frequent with men than with women, and with the wealthy than with the poorer classes. It is probable

that living too well, excesses in wine, and too little exercise, favour its development when the hereditary disposition exists, or may originate it *de novo*. Too much animal food, particularly those which are richest in nitrogen, are particularly baneful; but excess of any kind of food may bring out the gouty diathesis. Garrod, in speaking of the influence of drink on this malady, remarks that gout would perhaps have never been known had man been deprived of fermented drinks. The most injurious drinks appear to be port wine, champagne, Madeira, sherry, Marsala. Malt liquors, porter and beer, are undoubtedly baneful, but spirits and distilled liquors in general do not appear to do much harm.

Lead impregnation of the system is a cause which may produce this disease *de novo*, Dr. Garrod having found among his hospital patients that about 30 per cent. of those suffering from gout had been subjected to the influence of lead in their various occupations. Dr. F. T. Roberts remarked the same thing in his practice, and adds that some of the worst cases of this disease in its chronic form occurred in persons who were distinctly under the influence of lead-poisoning.

Gout usually appears before fifty years of age; it generally makes its first appearance in persons of thirty and thirty-five or forty years old. Well-marked gout is exceedingly rare under twenty; but it may occur even in children, being then, however invariably hereditary. Climates which are cold or temperate, and at the same time damp and changeable appear to have a consider-

able influence in the production of this complaint, particularly when the hereditary taint exists.

An acute attack of gout differs essentially from all other acute affections, which invariably disappear without leaving any traces behind them. With the gouty patient, each acute attack leaves some symptoms after it, and predisposes more and more to further attacks. When an excess of uric acid in the system exists, an individual is at any time liable to an attack of distinct gout, from the action of certain causes which would have no such effect upon other persons.

The fever and the pain which accompanies every attack of gout are thus explained. The first is the result of an abnormal quantity of an injurious principle in the blood and from its reaction upon the organism. Garrod attributes the pain to the presence of deposits in the cartilages, and from the tension which results, for when the gout is interarticular the pain is much more severe. When the deposits, on the contrary, take place at the exterior, the pain is very much milder and is sometimes almost *nil*, although the inflammation during the attack remains well characterised. Everyone knows the tendency that gout has to attack the smaller joints, and above all, the metatarso-phalangeal joint of the great toe. This is explained in the following manner :—In gout it is believed that those tissues are chiefly attacked which are either non-vascular or which are supplied with but few vessels and through which the liquids pass with difficulty (cartilages, ligaments,

&c.) The great toe offers all these conditions, as do all the smaller joints. In an acute attack several joints are usually affected in succession, while the inflammation subsides in those first affected, often most suddenly. This is accounted for by the deposit of urates in different joints successively, and when inflammation is thus excited in them it tends to subside in those previously affected.

An acute attack often occurs without it being possible to explain the reason of the sudden outbreak. Certain symptoms, however, generally manifest themselves before the primary attack of gout. These may be briefly related as follows:—Dyspepsia of a special character attended with flatulence, distension of the stomach, and pyrosis (waterbrash). Nervous symptoms are developed, such as spontaneous lassitude, cephalalgia, and great mental depression. The urinary secretions are usually diminished, the urine is very dark coloured, strongly acid and laden with solid particles and sediments. Should the blood be examined at this time the presence in it of uric acid will frequently be detected.

When the attack is imminent, no matter whether it be a primary attack or one of several, some of the general phenomena particular to the uric acid diathesis become exaggerated. Thus, the urine will scald, be scanty, and highly coloured, the digestive system will be deranged, &c.

The cause of the outbreak at other times may be easily traced to some excess in diet, to exposure to

damp, a chill, some mental worry ; sudden joy, grief acute illness, or some injury.

It is usual to describe separately *regular* gout, from *irregular* gout.

Regular or *normal* gout, that which has been described for centuries past under the name of *podagra* ($\pi\sigma\nu\varsigma$, foot ; $\alpha\gamma\varrho\alpha$, prey), is articular gout, either acute or chronic, partial or generalised.

Irregular abnormalous gout, also called non-articular, misplaced, and retrocedent gout, is that which affects some internal organ, and of which it is often difficult to identify the seat.

Acute articular gout is frequently only an episode in the life of a gouty individual, particularly when it is a case of hereditary gout, which is the most common. The attack comes on during the night in the majority of cases, while the patient is asleep in bed, usually between the hours of midnight and three o'clock in the morning. He is awakened by a violent pain in the metatarso-phalangial joint of the great toe. After one or two hours this pain becomes excruciating, and the unfortunate sufferer undergoes a perfect torture. The weight of the sheets becomes insupportable, his pain is increased by the slightest vibration of the bed, such as that caused by a person walking in the room or by a vehicle passing in the street. These pains are not necessarily limited to the joint primarily affected ; sometimes they affect the foot and the whole of the leg, and the patient will compare the suffering to that which would be caused by boiling oil, or liquid lead being

poured on the member. All the affected part becomes red and swollen, while the veins are often enlarged and turgid; a certain amount of œdema generally exists. Towards the morning the intensity of the pain is much diminished, the shivering which accompanied it disappears, and the patient is able to obtain a little rest. These symptoms are reproduced for four, five, or eight successive nights, the daytime being always relatively calm, and it is the whole series taken together which constitutes an acute attack of gout. During all this time the urine is generally scanty in quantity.

General symptoms always accompany an attack of gout. There is a certain amount of fever to which Professor Bouchard gives the name of "*fièvre goutteuse*." After two or three days the headache which existed at the commencement of the attack disappears. The skin is hot and dry. The patient complains of thirst, sleeplessness, and is usually constipated. The temper is generally very irritable.

Acute gout has a marked tendency to become chronic; the attacks at the commencement may be separated by an interval of one or of a number of years, but they gradually become more frequent, until one, two, or more attacks occur in the course of a year. While they increase in number their sphere widens. Each successive attack affects fresh joints, and tends to deform them more and more.

Chronic articular gout is generally only met with in subjects of a certain age. It is rarely chronic from

the very first, and is usually preceded by a number of acute attacks. There is no distinct line of demarcation between acute and chronic gout. The chronic form resembles the acute form with successive paroxysms, "with this important difference, that the attacks are longer, and that during the intervals the patients are never completely free from it" (Trousseau). The malady also affects a number of joints at the same time, and the swollen state of the joints is more persistent and often never completely disappears. The hands are particularly liable to be affected, as also the feet and the knees. While in acute gout the sufferer regains the liberty of all his movements, in chronic gout the movements become embarrassed, are more or less difficult or impossible, so that the patient may be utterly unable to walk. In general the acute attacks occurring during chronic gout are less painful and of longer duration than those which take place in the true acute articular form.

The formation of concretions of urate of soda, called *tophus* or chalk-stones, belongs more particularly to the chronic stage of the disease. These concretions, as Moore showed in 1811, require three periods to attain their definite development. After a paroxysm, during an interval of remission, and sometimes without any pain, a fluctuating liquid is seen to raise the skin. In the second period solid deposits are formed which increase in size. In the third period an ulceration of the skin takes place, with or without inflammation, and a chalky substance in larger or smaller quantities

escapes. These chalk stones are not only to be met with in the joints, they develop also in the external ear, and have been met with in the nostrils and in the eyelids.

The urine in chronic gout generally becomes abundant, is pale, of low specific gravity, deficient in solid ingredients, especially in uric acid.

Chronic gout affects the whole system ; the patient loses strength, the circulation becomes languid, and the tissues become flabby. The digestion is seriously interfered with, and a state of cachexia is frequently the result.

Irregular gout, or visceral gout, may give rise to purely functional troubles, or cause permanent lesions. There are many different forms of irregular gout, as we have already explained, but we will describe the general symptoms belonging to them all taken together.

Severe cephalalgia, asthma, gravel, haemorrhoids, and eczemas. These symptoms may appear in an individual who so far has had no attack of articular gout, and they continue without ever producing articular gout. Generally, however, articular gout is preceded some time before it breaks out by some of these manifestations. In some cases articular gout alternates with attacks of asthma or nephritic colic.

In retrocedent gout the manifestations are generally very much more sudden and more severe than those which occur in an attack of articular gout. The patient suffering from an attack of gout, being sub-

jected to too active a treatment, or from some inappreciable cause, the inflammation attacking the joint no sooner appears than it disappears at once, prematurely ; the gout then attacks some organ, or some particular part of the system, giving rise to the following symptoms.

In the digestive system will be noticed inflammation of the œsophagus, difficulty in swallowing, cramps in the stomach, continuous vomiting, cold sweats, tendency to syncope. There may be fever, intestinal colic, with or without enteritis. The nervous system is also affected : violent headache, delirium, epileptiform convulsions, coma. Sometimes the power of speech is lost.

Gout affects certain of the organs and produces permanent lesions in them. Fatty degeneration of the heart is common and also some valvular disorders. The arteries become brittle and there is a tendency to gangrene of the extremities ; the liver shows the characters of chronic congestion. The kidney is diseased, as is indicated mainly by the changes in the urine, which may be slightly albuminous or even contain a few casts.

We have gone somewhat into detail in describing the symptoms as it is as well that the patient should understand with what precautions the treatment has to be administered, and how no two patients can be treated alike in every case. A variety of circumstances must be duly considered before the doctor can decide what will be best. All cases of gout will derive

benefit from the Vichy waters ; but there are certain moments when the treatment is contra-indicated ; whenever the patient is suffering from an acute attack, or is just free from acute attack, the waters would be more harmful than useful.

There are three points upon which the whole of the treatment is based :

1st. To prevent or diminish the formation of uric acid.

2nd. To assist its elimination from the system.

3rd. To render its formation and elimination inoffensive.

We are prepared to affirm that no treatment exists that can fulfil these indications better than the thermal waters of Vichy, when assisted by a proper and suitable diet and hygiene.

We have already shown that the digestive functions and those of the skin and kidney are seriously affected in this disease ; those individuals in whom these functions are about normal are those who run the smallest risks of gout, for the integrity of the whole phenomena of digestion tends to prevent an excess of uric acid, and when it exists it is then more easily eliminated.

One of the first and most manifest effects of the Vichy mineral waters, when taken in proper doses and according to the exigencies of the case, is to regulate the digestive and stimulate the cutaneous and urinary functions, and thus, directly and indirectly, the Vichy waters assist in maintaining the integrity of the most

intimate phenomena of nutrition. We are therefore justified in asserting that the Vichy waters tend to preserve from gout, or to modify the gouty diathesis, by maintaining the integrity of the nutrition, or, when it is already affected, bringing it again into its normal state, and as it is precisely the phenomena of a defective nutrition which precede the gouty attack, we clearly show that the Vichy waters strike at the root of the malady.

The waters must be used in the intervals of attacks, and as far as possible from the last attack. If too near the last attack, a new one is to be feared, and it is necessary to be most prudent, for there is almost as much danger in provoking nature as in resisting its action in a crisis. The Vichy waters, drunk immediately, and baths taken injudiciously, cause very serious results in the case of a considerable number of gouty patients.

Dr. Lavigerie, in speaking of the influence of these waters in cases of gout, says : (translation.)

“ It is true that the Vichy treatment does not prevent the production of uric acid ; but, aided by a proper hygiene, it notably diminishes it. Whereas a more or less rigorous abstinence from nitrogenous aliments dries up one of the sources of this acid, the waters interfere with the marked movement of disintegration which gives birth to it. It is by their special action upon the functions of nutrition, particularly upon the digestion, the absorption, and assimilation, that they bring about this result. It is more than probable that these functions,

once seriously affected, are never definitely restored, and that the uric diathesis, although profoundly attacked, resists all our efforts ; but its manifestations are diminished and confined for a pretty considerable time. The disease would then little by little regain the upper hand if entirely left to itself. But who is such an enemy to his own health as not to resort again to a treatment the efficacy of which he has already proved ?

" The Vichy waters facilitate the elimination of the uric acid, as they increase the activity of the functions of the skin, notably the sweat secretion, which with patients affected with this diathesis, contains a certain quantity of uric acid ; but principally because they increase the activity of the renal secretion, the normal road of exit for this acid.

" They render inoffensive its formation and its elimination. Hardly is the uric acid formed than it finds itself in presence of carbonate of soda in the blood-vessels, and is immediately transformed into urate of soda. This cannot take place without diminishing the alkalinity of the blood, that is, without modifying its composition and compromising the general nutrition. It is from the aliments, and principally from the vegetable aliments, that the blood will in the end regain this carbonate of soda. But the Vichy waters will give it back to the blood at once, for it is impossible to admit that the circulation, deprived of a principle which is necessary to it, will not take it back as soon as the chance of so doing is

offered. And if the nutrition were languishing from this insufficiency, would it not be at least temporarily re-established ? Thus the disturbance, consequent upon the production of uric acid is neutralised by employing these waters.

"It is the same with the inconvenience depending upon its elimination. Urate of soda, when secreted in great abundance, tends to be precipitated as soon as it passes into the kidneys, sometimes preserving the urate form, sometimes being decomposed and passing again under the form of uric acid. . . . The waters of Vichy are all-powerful to prevent the precipitation of the urates and uric acid in the urinary system. This is one of their incontestable effects ; they act precisely in suppressing the causes of precipitation. If the urine is concentrated ; they render it more abundant ; if it is acid they render it alkaline, so that the urates in their presence can no longer be either precipitated or decomposed."

The springs that appear to be the best suited and to give the best results in gouty cases are the Hôpital and Celestins. We have already observed that the waters will not be always indicated, but even when indicated the treatment must be conducted with great prudence. Gout is a malady in which respect must be paid to the different outbreaks, and in which one must be careful not to interfere with the regular course of the attack, while gradually modifying the organic conditions which assist in its development. All active medication in gout is dangerous, and no medi-

cation can be more active than the Vichy waters absorbed in large quantities.

The Celestins springs are very active and will not suit every case in which the waters are indicated, but in combination with the Hôpital spring they will suit the majority of cases. The habit of prescribing a warm spring in the morning such as l'Hôpital, and a cold spring in the evening such as the Celestins, has the following advantages, putting aside the special properties of these springs: these cold waters act more rapidly and more powerfully upon the urinary secretion, by increasing the tension of the renal arteries. The uric acid is thus more promptly eliminated. The warm water remains longer in the tissues, and thus tends to modify the most intimate composition of the humours of the system.

Concerning the quantity to be prescribed it will vary in every case; it varies from one to eight glasses daily.

The baths are often beneficial, but this is not always the case. When the patient is subject to faintness and palpitations, if the gout has a tendency to be brought out by a slight cause they should be abstained from.

The diet will form an important auxiliary in the treatment. Moderation in the quantity of food is to be observed, but a very low diet is unnecessary and baneful, as it will only assist the development of the complaint by diminishing the patient's power of resistance. The more easily digested meats should be taken in preference. Pork, salmon, and salted meats should

be avoided. Meals should be taken at regular hours. Gouty patients should either abstain altogether from, or only take a very limited quantity of, sugar and saccharine articles of diet. Vegetables may be taken freely when digestible and not too rich in woody fibre. The juice of oranges and lemons is considered beneficial. Malt liquors and all the stronger wines are injurious. Claret, brandy, whisky, and gin may be taken in moderation. Excess of every kind must be avoided.

Exercise in the open air is most necessary, whether on foot, horseback, or in a carriage. Sedentary habits should be avoided, and also, when possible, all excessive mental work. Active habits should be encouraged—early rising and early retiring are to be recommended. Avoid all chills, damp, &c., and wear clothing in keeping with the weather.

CHAPTER XII.

CHLOROSIS—GREEN SICKNESS.—ANÆMIA.

CHLOROSIS ($\chi\lambda\omega\rho\circ\varsigma$, green or sallow) is the name given to a morbid condition of the system, characterised by a peculiar pale colour of the skin, and by various troubles in the different functions. Anæmia (a priv. ; $a\tilde{\imath}\mu\alpha$, blood) signifies a deficiency of blood in quantity, either general or local; also deficiency of the most important constituents of blood, particularly albuminous substances and red corpuscles. Therefore, chlorosis and anæmia are not synonymous terms; anæmia is only a symptom, which may have various different origins, but as the Vichy waters have very much the same action in both cases, we will describe them together.

Chlorosis is a variety of anæmia that occurs most particularly in young women about the time of puberty. The subjects of this diathesis are said to be *chlorotic*. Occasionally it affects married women; but so rare is it with men that an example is hardly ever met with. Its first appearance seems to be intimately connected

with the sexual development, the establishment of menstruation and its disorders. It may exist, however, before puberty, and in this case is probably due to the physical development of the child exceeding the recuperative powers of the system.

Heredity is one important cause in the development of this malady. Irregularities in the menstruation, nervous disorders, emotion, grief, fatigue, badly ventilated dwellings, a deficiency of light, are all causes which may occasion it.

The chlorotic subject is rarely thin ; the face and the hands have an increased fulness about them, and in colour somewhat resemble the yellow tint of old wax, sometimes with a shade of green in it. The lips and gums are pale.

The nervous troubles are more or less pronounced ; sometimes a mild form of hysteria exists ; the patient is sad, morose, irritable, subject to headaches, faintness, and neuralgia. There is a general lassitude breathlessness on the least exertion, and accompanied with palpitation. The appetite is usually affected, sometimes exaggerated, sometimes diminished ; there may be a craving for unwholesome and improper food. Constipation is habitual.

The heart is usually increased in size, particularly the left ventricle. The cardiac symptoms and cardiac and vascular signs are special, but it would be out of place to describe them here.

The menstruation is generally painful, irregular, scanty, and very pale ; sometimes it is altogether absent.

Rarely there is menorrhagia (profuse menstruation). Leucorrhœa (white discharge) is the rule.

The only part of the system that appears to be affected in this disease is the blood, which is affected in three ways :—1st. The total quantity of blood is below the normal. 2nd. Both the red and white corpuscles are deficient in number and that proportionately. 3rd. The individual red corpuscle contains less than the normal amount of hæmoglobin, and this deficiency may be so great that the total amount of hæmoglobin in the blood is reduced to one fourth.

With a chlorotic subject, the globular alteration is such that hæmoglobin oscillates between 30 and 70 per thousand instead of 110 per thousand, the normal proportion. This alteration in the composition of the blood is sufficient to explain the pale colour of those affected with chlorosis.

Thus in chlorosis there is a decrease in the number of globules. This is precisely what occurs in anaemia, and in this anatomical respect there is identity between anaemia and chlorosis. The only difference lies in the manner in which this result is brought about in the two cases.

We have already stated the principal causes which predispose to chlorosis, and shown how it generally occurs when the woman is approaching puberty.

Anæmia, on the contrary, may occur at any age, and the causes which occasion it are very much more numerous. It is more frequent with women than with men, but not uncommon with the latter. One of the primary

causes is a loss of blood, whether it be the result of haemorrhage or profuse discharges, such as suppuration catarrah, and albuminuria, by rapid growth and development; want of proper nourishment and defective hygienic conditions affecting the formation and nutrition of the blood, as want of light, air, and muscular exercise. It is often consecutive to acute or chronic maladies, &c.

Once these two complaints are fully declared they both give rise to very much the same symptoms as we have described for chlorosis. In both cases, we repeat, there is a deficiency in the number of globules; they therefore need very much the same treatment, which may be indicated thus:—To restore to the blood, become too watery, the globules that it requires. Once this result obtained, the chlorotic and anaemic symptoms will disappear.

Iron in different forms has from time immemorial been employed in these cases and with much benefit, as an excitant to the nutrition. It is not, however, always easily tolerated by the stomach, and is not nearly so easily assimilated as when intimately associated with other salts such as in the Vichy waters.

The Vichy waters stimulate the digestion, and, properly administered, tend to restore the nervous functions which regulate it to their normal condition.

The first effect of the waters to remedy the general and constitutional derangement is to act upon the digestive organs, which they stimulate, however enfeebled they may be. The nutrition in its turn be-

comes normal, and the blood is able to reconstitute its globules, procuring the necessary iron from the different aliments and from the Vichy waters, if a choice has been made of a spring rich in iron. In a few days in the majority of cases the appetite returns, and digestion goes on vigorously and regularly, and in a few weeks, when the thermal treatment is finished, the blood, being regenerated, is capable for the future of assuring the proper working of the stomach.

The entire system soon feels the effects of the first stimulating action. The menses, if absent, return and become both regular and normal,—the difficulty and oppression in breathing, the palpitations, &c., all disappear, the strength returns, and the sallow complexion is replaced by that of health.

The advantages of these mineral waters over the iron taken alone may be thus briefly stated.

Iron does not increase the appetite; it rather tends to decrease it and cause indigestion.

The Vichy waters, on the contrary, stimulate the appetite, and rarely fatigue the stomach when properly administered.

The injurious effects of the iron are intensified when the stomach is in any anomalous condition, particularly in dyspepsia and gastralgia, so common with chlorotic and anaemic subjects.

Not only are the Vichy waters easily tolerated by patients affected with these same maladies, but they tend to cure these very complaints.

Thus the Vichy waters, while stimulating the

nutrition in the same way as the iron, have this advantage over it, that they exert a favorable influence over the principal digestive organs, which the iron, on the contrary, tends to inconvenience.

It is preferable to prescribe a spring fairly rich in iron, as a certain amount of iron is necessary to regenerate the blood; the Mesdames, Lardy, Sainte-Marie, and Nouvelles Celestins are all springs that can be recommended, though, according to the particular case, a judicious choice among them will be necessary.

Concerning the quantity of water to be absorbed, we repeat here, what we have already said on many occasions, it must be determined according to the state of the patient at the time she comes to this station. Small doses are generally necessary at the commencement.

Mineral baths will do good, but the temperature should not exceed 30° C.

A number of patients will derive much good from douches, but in some cases they will be contra-indicated.

Congestion of the Spleen.—Malaria.—Intermittent Fever.

Malaria is a peculiar earth-born poison which is the cause of all the types of intermittent and remittent fevers, and of the degeneration of the blood and the tissues resulting from long residence in places where

the poison is generated. By the researches of Professor Thomassi Crudeli, of Rome, and Klebs, of Prague, who made the physical cause or poison to which malarial fevers are due the subject of careful investigation in the *Agro Romano*, in 1879, and who discovered a microscopic fungus to which they gave the name of *Bacillus malariæ*, much important information concerning this malady has been obtained. Marchiafava-Cuboni and others have also made it a special study, but it still remains a very obscure subject and one which it will not serve any useful purpose for us to discuss.

Malaria has generally been said to be the product of heat, moisture, and vegetable decomposition. Marshes, the combination of fresh and salt waters, the disturbance of large tracts of land, such as in the construction of canals, the clearing of ground for arable purposes, the digging of pits and carting away the earth, the erection of buildings, &c., are all favorable conditions for the outbreak of this malady. It is not necessary for the country to be marshy,—the malaria may be under the crust of the soil, and only do its mischief when the ground is worked upon. This was the explanation of the malarial fevers in Paris in 1811 when the St. Martin Canal was being dug, and again in 1840 during the construction of the fortifications.

In some countries it is endemic, and particularly in the warmer climates. In France, it is common in Bresse and Sologne; in Italy in the Pontine marshes and Roman Campagna; at the mouth of the Danube,

Lower Egypt, Senegal, Madagascar, Algeria, India, Persia, Cochin China, the Gulf of Mexico, Central America, &c. Malaria may also develop in ships returning from unhealthy climates, and then may be the result of unwholesome water, the bad sanitary condition of the ship, or the sufferers may have had their systems charged with malaria before embarking. Temperature exercises great influence over its development and activity and it is very rare in cold countries.

Malaria may be characterised by febrile symptoms, intermittent or remittent fever, or the febrile symptoms may be wanting, and the disease be specially characterised by a state of cachexia and other symptoms.

As the acute form of this disease will not benefit by the thermal treatment we will limit our description to the chronic form, over which the Vichy waters have great influence.

The chronic form may be primary, but usually it succeeds to the acute form. One of the most striking symptoms is the anaemia, which is developed at a very early date and with great rapidity. This anaemia is the result of the vitiated state of the blood, and is not surprising when one knows that a single attack is sufficient to destroy many hundreds of thousands of red blood-corpuscles per cubic millimetre. At the same time the proportion of the white globules is generally considerably increased. The albumen is diminished, the blood loses its plasticity, becomes more fluid, and tends to give rise to oedema. The skin be-

comes of an earthy hue, the patient loses flesh, suffers from lassitude, palpitation, &c.

The internal organs suffer also ; the liver becomes enlarged ; but the most characteristic lesion is enlargement of the spleen, which may acquire an enormous volume. This hypertrophy is gradual and may not be very pronounced for some months, but it is continuous as long as the malady is not checked. This condition of the spleen occasions a painful sensation of weight, and causes a certain amount of inconvenience in walking, but it is not necessarily incompatible with a relatively fair state of health. Neuralgic pains are common, particularly over the eyebrows.

The efficacy of the thermal alkaline treatment in this disease has been long since proved. Rebellious intermittent fevers, notably the fevers contracted in Africa, over which sulphate of quinine has had no control, are also cured by the thermal treatment, as numbers of cases so treated in the Vichy military hospital prove.

These waters contain, besides bicarbonate of soda, to which we have had so often to refer, and the iron, another principle which in these disorders is of great value,—we mean, arsenic. All the springs of Vichy contain a minimum of at least two milligrammes of arseniate of soda per litre, which is equivalent to twenty drops of Pearson's arsenical solution. Some springs contain as much as three milligrammes per litre.

Thus where sulphate of quinine is powerless, the re-

constituting effects of the Vichy waters can be utilised, which act not only by their alkaline and ferruginous qualities, but also by the arsenic which they contain. The beneficial effects of arsenic in this kind of fever are well known as also their efficacy in cases of cachexia. In the treatment of intermittent fevers it holds the second place to sulphate of quinine, and is specially recommended in inveterate intermittent fevers.

The thermal waters act by aiding the nutrition so intensely affected, and commence their action by restoring tone to the organism, thereby enabling it to cope with the disease.

The digestive functions are the first to be influenced, the appetite increases, the digestion becomes easier, and the food is more perfectly assimilated. The neuralgic symptoms disappear, the skin becomes of a more healthy appearance, and eventually the spleen begins to decrease in volume. This decrease is very gradual, and it will sometimes happen that the spleen will never altogether regain its normal size, but this is of little moment if the malaria be cured. At other times the congestion appears to give way much more rapidly under the treatment, and in the course of a few months the spleen will return to about its normal condition. A great deal depends upon how long the complaint has existed before the patient comes up for treatment.

The Vichy waters, taken internally, or administered by means of baths or douches, are most effectual

against the congestion of the spleen. The patient should drink at the Grande Grille or at l'Hôpital according to the state of the digestive organs. According to the case, the doses will vary from two to six glasses daily. Generally it will be found useful to associate some ferruginous spring, such as Mesdames or Lardy, with the above, to combat the anaemia.

The baths, if indicated, should be taken with the same precautions as we have suggested when treating of complaints of the liver.

CHAPTER XIII.

DIABETES MELLITUS.

DIABETES MELLITUS ($\deltaιa$, through; $\beta aίνω$, I flow; and $\muελιττa$, a bee) is a malady characterised by an excessive urinary secretion containing a notable quantity of sugar, and accompanied at the same time by an exaggerated appetite and great thirst.

Sugar is indispensable to life; it fixes itself in the anatomical elements and there undergoes certain transformations. It is essential for the renovation of the tissues, for the internal combustion, and is a source of heat and of power.

Few diseases have been more carefully studied or have given rise to more numerous theories than diabetes. Though much has been discovered concerning its origin; though Claude Bernard, Bouchardat, Rouget, Mialhe, Pavy and others have made many important physiological discoveries directly concerning it, it still remains one of those diseases upon the origin of which opinion is most divided, and upon the intimate nature of which there yet remains much to be discovered.

Before discussing the causes and symptoms we

will explain a few of the theories held on the origin of this malady.

Sugar is introduced into the body with the different articles of diet. Glycogen, a substance closely allied in chemical composition to grape sugar, is of organic formation, and is found in considerable quantity in the organism, most abundantly in the liver. After a certain time, sugar takes the place of glycogen; but the exact mode and time of this conversion are not known.

Normally the blood contains a proportion of 1 per 1000 of sugar, and that without reference to the quantity of sugar, much or little, that may be introduced into the system with the different articles of food.

Normally sugar never appears in any notable quantity in the urine, and as it does not appear in any appreciable quantity in any of the other excretions it follows that this sugar must disappear in the body, and that there is equilibrium between what is introduced into or fabricated in the system and what the system employs. When this equilibrium no longer exists a pathological state intervenes, either by the over-production of sugar or its diminished consumption. The sugar is then found in large quantities in the urine, and in the blood may attain as much as 3, 4, 5 per 1000. Pavy has found it as much as 5, 3 per 1000.

The question to be solved is this: Under what conditions and from what causes does the quantity of sugar normally contained in the blood attain the

pathological figure? To explain this it will be necessary to follow a few of the transformations that food undergoes after having been introduced into the system, as the sugar in the economy and the blood has divers origins, particularly from starch and different substances containing sugar.

The first action that the food undergoes is salivation. The saliva has the power of converting starch into glucose or grape sugar; dextrine, cane sugar, the sugar of milk, undergo the same changes under the influence of the saliva, the pancreatic and intestinal juices, they are absorbed by the portal veins and conveyed to the liver. In the liver they undergo another change and become transformed into glycogen, and leave the liver under the form of glucose.

The important fact that the liver normally forms glucose or grape sugar, or a substance readily convertible into it, was discovered by Claude Bernard in the course of some experiments which he undertook for the purpose of finding out in what part of the circulatory system the saccharine matter which was absorbed from the alimentary canal disappeared. With this purpose he fed a dog for seven days with food containing a large quantity of sugar and starch, and, as might be expected, found sugar in both the hepatic and portal veins. He repeated the experiment, employing meat only, and still found sugar in the hepatic veins. Repeated experiments gave always the same results—no sugar being found in the portal

veins, under a meat diet if care were taken, by applying a ligature on it, to prevent the reflux of blood from the hepatic venous system. Bernard found sugar also in the substance of the liver. It thus seemed certain that the liver formed sugar, even when, from the absence of saccharine and amyloid matters in the food, none could be brought directly to it from the stomach or intestines.

Bernard found, subsequently to the above-mentioned experiments, that a liver, removed from the body, and from which all sugar had been completely washed away by injecting a stream of water through its blood-vessels, will be found, after the lapse of a few hours, to contain sugar in abundance. This post-mortem production of sugar was a fact which could only be explained by the supposition that the liver contained a substance, readily convertible into sugar in the course merely of post-mortem decomposition; and this theory was proved correct by the discovery of a substance in the liver allied to starch, and now generally termed *glycogen*. We may believe, therefore, that the liver does not form sugar directly from the materials brought to it by the blood, but that glycogen is first formed and stored in its substance, and that the sugar, when present, is the result of the transformation of the latter.

Albuminous matters are also subject to decomposition by the liver in another way. All are agreed that glycogen is formed, and stored temporarily, by the liver-cells, and that it is not formed exclusively from

saccharine and amylaceous foods, but from albuminous substances also, the albumen in the latter case being probably split up into glycogen, which is temporarily stored in the liver, and urea, which is excreted by the kidneys.

Fats, glycerine, and gelatine also produce sugar.

There are two chief theories on the subject of the destination of glycogen : (a) That the conversion of glycogen into sugar takes place rapidly during life by the agency of a ferment also formed in the liver, and the sugar is conveyed away by the blood of the hepatic veins, and rapidly undergoes combustion. Where the combustion, or oxidation, occurs is not quite clear. (b) That the conversion into sugar only occurs after death, and that during life no sugar exists in healthy livers, glycogen not undergoing this transformation. The chief arguments advanced in support of this view are : (1) That scarcely a trace of sugar is found in blood drawn during life from the right ventricle, or in blood collected from the right side of the heart *immediately* after an animal has been killed ; while if the examination be delayed for a very short time after death sugar in abundance may be found in such blood. (2) That the liver, like the venous blood in the heart, is, at the moment of death, completely free from sugar, although afterwards its tissue speedily becomes saccharine, unless the formation of sugar be prevented by freezing, boiling, or other means calculated to interfere with the action of a ferment on the amyloid substance of the organ.

Instead of adopting Bernard's views, that normally, during life, glycogen passes as sugar into the hepatic venous blood, and thereby is conveyed to the lungs to be further disposed of, Pavy inclines to the belief that it may represent an intermediate stage in the formation of fat from materials absorbed from the alimentary canal.

We have already shown that normally the arterial blood contains about 1 in 1000 of sugar, and the venous blood much less; that this normal state is the result of the production and the consumption of the sugar being in the same proportions; that should the equilibrium between them be destroyed, sugar will be found in the urine in notable quantity, perhaps only for a short time, constituting glycosuria ($\gamma\lambda\nu\kappa\upsilon\varsigma$, sweet; $\omega\nu\varrho\sigma\nu$, urine); or it may be chronic and constitute diabetes. It remains to be shown how the production becomes excessive or the consumption diminished. There are numbers of theories on this subject, and it would be impossible to explain the whole of them, so we shall content ourselves with touching upon those most generally accepted and the most important.

Theory of Mialhe.—The sugar which exists in the economy is derived from the feculent aliments. In the stomach they are converted into glucose by the salivary secretion, which acts as a ferment, and that notwithstanding the acidity of the gastric juices. Once in the blood it decomposes the alkaline carbonates, which are found there in profusion, it displaces the carbonic acid and forms glucosates with the bases,

very unstable salts, which by a series of transformations soon produce water and a fresh proportion of carbonic acid.

Thus carbonic acid is formed both by the decomposition of the carbonate and by the combustion of the glucosates. Part of this acid is eliminated, while the remainder combines with the alkalies which are freed by the combustion, and forms carbonates which in their turn will decompose fresh quantities of glucose. These transformations are reproduced over and over again.

Should the alkaline carbonates, however, be in insufficient quantity in the blood, the glucose is no longer decomposed and is found in the secretions. When the proportion of glucose is not excessive, the system will get rid of it by the easiest road of egress, that is by the kidneys, but this is not a sufficient outlet when there is great superabundance in the blood. Sugar may then be found in almost every one of the secretions or excretions.

Diabetes, therefore, according to Mialhe, is essentially due to an insufficiency of alkalinity in the blood.

Bouchardat was of opinion that the digestion of aliments rich in starch was very rapid with the diabetic subject, probably owing to some modification in the structure of the pancreas, and that the stomach, to correct this, secreted a greater quantity of gastric juices ; sugar being thus formed in a larger quantity, and its combustion decreased because of the diabetic's temperature being always lower than normal.

According to Claude Bernard, the liver had the property of secreting sugar in the same manner as it secretes bile, no matter what food might be introduced into the system, as long as it was in its normal condition ; this sugar is transformed into water and carbonic acid by the respiration as it is produced, but should it be formed in too great a quantity the respiration is no longer capable of effecting the transformation of the whole of it into water and carbonic gas, and the excess is got rid of by the urine. Therefore, for Claude Bernard, diabetes is the result of an exaggerated production of glycogen, caused by a general derangement in the nutrition, but more particularly by some disorder of the liver.

MM. Sanson and Rouget have individually tried to prove that it is not the liver alone that produces sugar but that it is to be met with also in the kidneys, spleen, lungs, &c., and that dextrine is to be found in the tissues of all animals, in that of the herbivora as well as that of the carnivora ; that this glycogenous substance is not produced from the substance of these organs, but is the result of a diet in which starch forms a large part, or an animal diet in which there is normally a considerable quantity of dextrine.

M. Reynosco admits that the sugar formed in the economy is destroyed by combustion by means of the oxygen introduced into the system by respiration, and he pays little heed to the influence that the alkalinity of the blood may have in getting rid of the sugar by the reactions we have already described. Considering

the influence that the respiration has upon the decomposition of the sugar, and losing sight of all other influences, he holds that should the respiratory functions be interfered with, the sugar can no longer be completely consumed and that it then appears in the urine. Claude Bernard, in irritating the pneumogastric nerve of rabbits, produced a certain paralysis of respiration, and sugar appeared consequently in their urine. Reynosco attributed this presence of sugar entirely to the partial paralysis ; he also experimented on animals by giving them substances that rendered the respiration embarrassed, such as anaesthetics and gases, irrespirable gases, and constantly found sugar in the urine of the animals after the experiment ; he has also remarked that in the course of certain maladies in which the respiratory functions are affected, such as in pulmonary phthisis, pleurisy, asthma, chronic bronchitis, &c., sugar is often to be found in the urine ; he therefore concludes that diabetes is the result of some obstacle to respiration.

The generally accepted theory now is that the diabetes results from some general trouble in the nutrition, without making the liver solely responsible for all the mischief.

This derangement in the nutritive functions has been differently interpreted. Some authors attribute it to an exaggerated disassimilation, an abnormal decomposition of the tissues causing an excess of glycogenous substance to be liberated. For other authors, the formation of glycogen is normal, but the system does not

use a normal quantity of it, so that an excess of glycogen remains.

The first theory admits the exaggerated disassimilation of the nitrogenous substance of the tissues (Lecorché); the decomposition of the nitrogenous substance into glycogen and urea (Jaccoud). According to another theory (Mialhe), the sugar is insufficiently consumed in the tissues, or the ferment that should decompose the sugar is wanting. According to M. Bouchard, the nutritive trouble which leads to diabetes is "primarily and essentially characterised by an insufficiency in or some trouble in the assimilation and more particularly by an insufficiency in the consumption of sugar in the anatomical elements."

The classification of cases of diabetes according to causation has been attempted by some authors, but is practically impossible in very many cases. Two principal divisions are usually recognised: essential or true diabetes, of which the general causes are not very clearly defined; and symptomatic diabetes associated with some nervous lesion. The division may be admissible for the extreme and well-marked cases, but it is absolutely impossible for a host of intermediate cases.

Diabetes may appear at any age; it is more common in children than is generally supposed, as frequently the parents and relatives do not have their attention called to this disease until it has assumed very serious proportions. It is most frequent, however, between the limits of thirty-five and forty-five years of age.

Men appear to be very much more liable to this malady than women, the proportion being two thirds of men to one third of women. There appears to be an undoubted tendency to heredity. This heredity, as in many other maladies, is peculiar, the diabetic tendency in one branch of a family being represented in another branch by various nervous disorders, especially epilepsy and imbecility. No malady appears in a more insidious manner than diabetes. For a long time its existence is usually ignored, as those for the most part who are affected are well-built, powerful-looking men, who for a considerable time preserve their healthy appearance and their activity.

Climate has a decided influence in the production of this disease, for it is more common in cold and damp countries than in warm and dry countries. This is proved by the great number of persons who are affected with this disease in England, Holland, France, Russia, &c. Verneuil and Burdel consider that malaria may be an active agent in its production.

Of the so-called exciting causes there are two of the first rank, namely, injury or disease of the brain, and mental excitement, or perhaps still more, worry; tumours and other local brain mischiefs. Certain mental emotions, at once powerful and prolonged, which may be epitomised in the single word, strain, apparently act as exciting causes of diabetes, such as continuous anxiety, long-lasting grief, or excitement followed by reaction. Certain errors in diet—an excess is more apt to produce the malady than an

insufficiency of food, but both conditions may produce it. More especially may be mentioned the excessive use of hydrocarbons, and sugar in particular. Besides the solid amylaceous food, the action of fermented liquors has been held forth as an active agent in its production when the hereditary tendency to the disease exists. We think that in this particular case they are much less baneful than many people suppose, although we admit that if taken in excess they may have a certain influence, on account of their deleterious action on the liver.

Usually the patient has been ill for many months before he consults the physician or has any idea that he is suffering from so serious a malady, and it is only when some one of the symptoms becomes troublesome that he seeks advice. His health will have been failing for some time, and the principal symptoms he will complain of are the following: great thirst, hunger, and a constant desire to pass water, while he will also be probably losing flesh.

All these symptoms are of great importance and require to be studied separately as well as other less marked symptoms that gradually become developed. It will be useful to commence by describing the quality of the urine, as it will enable us to explain some of the other symptoms.

The abundance of the urine is one of the most constant symptoms of the malady, and is generally in direct proportion to the thirst. The patient frequently passes as much as eight, ten, or more pints of urine in

the twenty-four hours. It is generally light in colour, acid, and contains a high proportion of sugar. The presence of the sugar causes the density of the urine to be much greater than the normal ; instead of 1018 or 1022, it will be 1030 or 1050, and in certain cases may reach as high as 1060 and 1070. Its characteristic quality is the presence in it of a notable quantity of sugar, which varies considerably according to the stage of the malady and to the particular case.

In the earliest and slightest forms of diabetes it may only appear in an intermittent form after the consumption of an unusual quantity of starchy or saccharine food. The sugar in the urine is glucose, of the kind called dextrose. The initial period, more or less latent, may continue for some time, but eventually the proportion of sugar will increase. To obtain the correct amount it is necessary that the analysis should be made upon the entire quantity passed in the twenty-four hours ; it is usually from 8 to 12 per cent., but varies. The total quantity in a mild case is from 50 to 100 grammes (or from 2 to 4 ounces) ; in a severe case it may be as much as 1000 grammes (38 ounces) ; the more usual quantity varies from 200 to 250 grammes (6 to 9 ounces). Along with the presence of sugar will be found a notable increase in the quantity of urea ; the percentage per litre will be below the normal, but the total quantity excreted in the twenty-four hours, which normally is

25 grammes, will vary from 60 to 100 grammes and may even exceed this last figure.

The chlorides and phosphoric acid are also increased; the first from 10 grammes, the normal, averages 36 grammes, and the latter from 2 attains 10 grammes.

Very great inconvenience may arise in diabetic females, or even in males, by the arrest of saccharine urine about the external genitals, producing a raw or eczematous condition of the inside of the thighs and groins. Involuntary passing of the urine is common, especially at night, and among diabetic children.

To discover the presence of sugar in urine, recourse can be had to Pavy's, Trimmer's, Fehling's, or Boettger's test.

By Pavy's method one obtains a quantitative analysis of the sugar. According to the English system of measurement Dr. Pavy's solution is the most convenient. It consists of sulphate of copper, 320 grains, dissolved in ten ounces of distilled water; and tartrate of potash (neutral) 640 grains, with caustic potash, 1280 grains, also dissolved in ten ounces of distilled water. One hundred minims of this mixed fluid are decomposed by half a grain of sugar. Only a minim measure and a porcelain capsule or other vessel which will stand heat are necessary. The procedure is as follows:—Most specimens of diabetic urine, containing too much sugar for accurate testing, first require dilution with water, and the most convenient degree of dilution is when one tenth of the solution is urine. Next put ten cubic centi-

metres of the metric copper solution (sulphate of copper 40 grammes, tartrate of potass. (neutral) 160 grammes, liquor sodæ (sp. gr. 1·12) 750 grammes, water to 1154·5 cubic centimetres), or one hundred minims of Pavy's solution, carefully measured in a small porcelain capsule. The porcelain capsule with its contents is to be placed on an iron retort stand at such a level that the flame of a spirit lamp will easily play on the capsule. Meanwhile a pipette, graduated from above downwards, either in minims or cubic centimetres, is filled up exactly to the 0 in the graduated scale with the diluted urine. When the solution of copper is boiling, the urine is added to it from the pipette, drop by drop, stirring carefully the while, until signs are shown of a decolouration of the cupric (blue) solution. As soon as the liquid is quite clear, the addition of the diluted urine is stopped, and the quantity already used read off on the graduated pipette. To ascertain the quantity of sugar in the urine is a simple calculation. We know how much urine has been employed in reducing the ten cubic centimetres, or 100 minims of the cupric fluid, but these measures represent exactly fifty milligrammes and half a grain of sugar respectively. The quantity contained in the diluted urine being hence deduced, multiply this by 10, to get the quantity contained in the urine as passed. Next multiply by the total amount of urine passed in twenty-four hours, to ascertain the full amount of sugar passed in this period.

A simple way of recognising the presence of sugar without making the quantitative analysis is Trimmer's test, which consists in the addition of a drop or two of a solution of copper sulphate, followed by a larger quantity of caustic potash. When the liquid is boiled, an orange-red precipitate of copper suboxide indicates the presence of sugar.

We should not advise diabetic subjects to analyse their own urine; it is better for them to keep their thoughts as much as possible occupied otherwise than with their malady, and the constant watching every morning for a decrease in the quantity of sugar, when perhaps it remains stationary or is even increasing, cannot but be baneful to them, as worry ought to be avoided. An analysis is necessary from time to time and should then be confided to the care of the chemist.

The thirst is in direct proportion to the urine passed and the quantity of sugar excreted or contained in the blood. In extreme cases the blood may contain as much as 400 grammes, and how it affects the thirst is easily explained. Professor Bouchard says:— “The thirst which torments diabetic subjects is explained satisfactorily by facts that we know concerning the action of diastase upon starch. In order that the transformation of starch into sugar may be complete, it is necessary that the starch be dissolved in at least seven times its weight of water. This same phenomenon takes place with the diabetic subject. Before the transformation of starch into sugar, which

is a necessity in their state, is possible, they require seven fractions of water, and as long as this quantity has not been ingested it is impossible for them to resist drinking. With the diabetic patient, thirst is in direct proportion to the feculent aliments and sugar that they take. I have observed that for a quantity of aliments representing one kilogramme (2 lbs.) they usually drink seven kilogrammes (about six quarts) of water and excrete about eight kilogrammes of urine."

Though this is generally true it is not always so. Some diabetics are tormented with thirst (*polydipsia*) for a lengthened period when the sugar contained in the urine is relatively small ; on the other hand, cases are met with in which the sugar is excessive and the thirst little more than normal. This only proves, however, the saying that there is no rule without an exception. To alleviate this insatiable thirst the patient is frequently obliged to get up in the night, and many before retiring to rest will be particular to see that a large quantity of drinking-water is within their reach. The polydipsia is more marked in diabetes insipidus than in diabetes mellitus.

The mouth is generally dry and clammy, the gums are covered with scanty, sticky mucus, the breath is often sweetish, or it may be foul. The lips and the gums become livid, the latter soften and appear to retract, the teeth become loose and fall out, usually without pain and without being necessarily attacked with caries.

Another feature in this disease is the increased appetite ; the food, however, seems to do the patient little good, for he is constantly growing thinner. The appetite is often ravenous (*bulimia*) or may simply be exaggerated (*polyphagia*). This symptom is less constant and later to appear than the other symptoms which we have described ; its cause lies in the heavy losses that the system is undergoing in sugar, salts, and urea. This exaggeration in the appetite tends to compensate for a time the heavy drain that the system is undergoing, and may result in the patient putting on flesh at the commencement of the malady, but later on this large quantity of food is no longer digested and the patient begins to lose flesh, unless the disease has been checked in time. Constipation is the rule.

The skin is dry and harsh. As a consequence of the sugar in the blood, all the secretions are more or less sweetened, notably the cutaneous secretion, which contains sometimes so much sugar that the skin appears to be covered with a kind of hoar frost. In the saliva sugar will also be found, and this secretion, instead of being alkaline, is acid.

With the emaciation is associated weakness, weariness, and disinclination to exertion. This may be observed at an early stage of the malady, but it increases markedly towards the close of the disease.

To this long list of general symptoms must be added a certain number of secondary symptoms and complications, many of which may interfere materially with the successful treatment of the disease.

The diabetic subject is liable to a number of skin diseases ; his skin is dry and rough, and eczema, prurigo, intertrigo, &c., are frequent. At a very early stage of the disease may be seen boils and carbuncles, though the latter tend rather to make their appearance at a late stage of the disease.

The anthrax is almost always single, and has a predilection for the back of the neck, the back, or the thighs. Its appearance is gradual, the pain is slight, and it usually cures as soon as the mortified tissues are eliminated. Gangrene has a great tendency to develop, and when it attacks deeply the extremities is a very serious symptom ; when it is superficial it is generally curable. The tendency to gangrene requires the surgeon and physician to be very cautious before performing the most insignificant operation on a diabetic subject ; the application of a simple blister has been the cause sometimes of producing most serious results.

Phlegmons and phlegmasia (inflammation) occur in every stage of the disease, and have a notable tendency to end in gangrene, whether they attack the viscera or simply the skin. Pneumonia is far from rare and frequently ends in gangrene of the lung.

Pulmonary tuberculosis is another frequent complication ; it generally appears in a late stage of the disease when the patient has for some time been losing flesh. In many respects it differs from ordinary phthisis as it rarely gives rise to spitting of blood

the fever is not so pronounced, nor is the perspiration as considerable as in normal pulmonary tuberculosis.

The sight is very frequently affected and becomes imperfect. This condition is termed diabetic amblyopia. The patient finds some slight difficulty in reading, the characters become hazy, or the patient may become nearly blind (*amaurosis*). This condition may occur at any moment during the malady, and is generally in proportion to the quantity of sugar excreted. It frequently increases or decreases in the course of the disease and under the influence of a salutary *régime* may suddenly disappear at the same time as the glycosuria diminishes; in three days sometimes the sight becomes normal. M. Lecorché remarked in some cases that the vision became exceedingly troubled after a meal, when the urine contained a larger quantity of sugar, and that at other moments of the day it became much more distinct. A form of retinitis not unlike that of albuminuria is sometimes found.

The most important visual trouble, however, is the formation of diabetic cataract, which differs from the ordinary cataract by the rapidity of its evolution, in its being usually double, and in its attacking young subjects. Operations in such cases do badly till the disease is cured, and are seldom tried, for the cataract occurs late in the disease, and advances rapidly. It appears to be more frequent in men than in women and is of the soft variety. It is sometimes preceded

by neuralgia affecting the temporal or supra-orbital regions, but more usually by slight amblyopia.

Early in the history of the disease all sexual appetite disappears and sexual power soon fails in the male, but with improvement this may return. Even when the power exists it is rare for the woman to conceive as the spermatozoa are placed in an unfavorable medium when sugar is present. Women who are thoroughly under the diabetic influence become rarely *enceinte* and are usually affected with troubles in the menstruation, which becomes irregular or may entirely cease.

The cerebral troubles occupy an important place in the history of the diabetic subject. The mental powers fail and he is indifferent to all around him, becomes dreamy, and lazy. Congestion of the brain is not rare; aphasia (difficulty in expressing by words), transitory or permanent, and coma are to be observed. This last is one of the most terrible accidents of diabetes; it is generally preceded by gastro-intestinal troubles, vomiting, diarrhoea, &c. Diabetic coma varies in duration from some hours to three or four days. It is more frequent with young patients, and the attack is often brought on by some violent exercise, fatigue, or journey, which is a caution to the diabetic subject not to over-fatigue himself.

Albuminuria exists in two thirds of all diabetic cases and is met with as frequently in the mild as in the severe forms of the disease. The presence of albumen in the urine causes the specific gravity

to fall, and is liable to give rise to false hopes if not recognised, as the inference would then be that as the specific gravity had decreased the diabetic state must be improved. The only true test of recovery is the power of consuming ordinary mixed food with impunity. Though albuminuria is an unfortunate complication it has not all the gravity that used to be attached to it when it was supposed to be an indication of Bright's disease. Bright's disease may appear, but the usual diabetic albuminuria has a different origin. "It is probable that it is caused by some more considerable derangement in the nutrition, the anatomical elements permitting the passage of the albuminoid matter without having made it undergo the chemical transformations which should cause it to acquire the nature of crystalloid matter" (Bouchard). Albuminuria is without any direct relationship to azoturia.

Azoturia may exist after the same manner as albuminuria. Its gravity is differently appreciated, but for most authors, unless it becomes excessive, it should not be regarded as a very serious complication. When the quantity of urea reaches 50, 60, and 100 grammes, then it has a very serious signification. It is to be met with in every variety of diabetic case, the mildest or the most severe are equally liable to present azoturia.

At different periods of the disease it is not rare to see œdema of the extremities, which may some days be very much more marked than on others.

The temperature of a diabetic subject is generally from 2° to 3° C. below the normal.

With all these various and serious symptoms it is a remarkable fact that the anatomical lesions are almost *nil*, and none which are peculiar to the malady.

The liver is sometimes very congested and largely increased in volume, but this may quite as easily be the *result* as the *cause* of the disease.

The kidneys are frequently found diseased, but the changes are not uniform. They are usually very congested. Sometimes they have become modified by fatty changes; amyloid changes have also been observed.

It would be puerile to suppose that the Vichy waters, unaided by any treatment, would cure this malady, although they may benefit it. Thus hygiene and a proper *régime* are indispensable adjuncts to the treatment, without which the waters are almost useless.

Bicarbonate of soda has been employed for ages past in the cure of this malady, upon the principle of rendering the blood more alkaline, and thus aiding the combustion of the glycogen. It has proved most useful, but is far from having the same efficacy as the thermal waters; for when it can no longer bring about any further improvement, the Vichy waters produce surprising and most favorable results. The bicarbonate of soda which they contain in so large a proportion is doubtless the principal acting factor, but there must be something more, either in the other salts, or in the peculiar manner in which it is held in solution, which allows the system to assimilate it with

more profit, and permits it to penetrate with more facility the minute anatomical elements of which the system is made up. We know what a wonderfully powerful agent these waters are, and if we are unable to explain exactly the manner in which they operate, how is it that under this treatment, within a few days the quantity of sugar contained in the urine may be but one half or less than that it was before they were administered ? We say therefore that this is no reason for discarding such a powerful and beneficial agent. Some day, and perhaps at no far-off date, physiology and chemistry aiding, more light will be thrown on this subject. In the meantime we must employ them, knowing the results that we shall obtain from them, though unable to explain by what mechanism they are brought about.

These waters have been judged by the first medical men of the world as to their efficacy in the treatment of diabetes. Professor Lecorché, of Paris, thus expresses himself ('*Traité du Diabète*', p. 432, 1887) :

"The effects of the Vichy waters soon make themselves felt. Their effects may be perceived after the second or third day of the cure. In the first place they consist in chemical modification in the composition of the urine. The urine which was acid becomes alkaline ; polyuria diminishes ; micturition is modified. It is less frequent during the night and near to the hours of the meals, that is to say, that little by little it regains its normal character. At the same time, the thirst and dryness of the mouth disappear,

and from the very first week—sometimes from the very first days—the glycosuria diminishes. It may completely disappear. Usually the elimination of sugar continues, but in a lesser proportion than when the patient arrived. The appetite increases and by degrees the patient loses the disgust that he had for nitrogenous aliments.

“The improvement in the general condition, the return of strength, tone, and sleep, closely follow upon the changes that the urine is undergoing. The alkaline waters, without a doubt, cause all the symptoms due to the glycogenic poisoning to disappear.”

And further on, Professor Lecorché remarks that if the action of the Vichy waters was only temporary, that they would still be most useful for the patient, as the glycosuria does not return at once with the same intensity, and that one is able, by paying strict attention to diet and hygiene, to keep it within reasonable bounds, so that the health does not materially suffer. “It will suffice, then, to return now and again to the use of the Vichy waters, to take out another season, to check the progress of diabetes.”

Professor Rousseau thus expresses himself :

“Alkaline salts are of incontestable value in the treatment of diabetes mellitus. They act as powerful modifiers of the digestive apparatus, of which they regulate the functions. They have not a curative action in diabetes, but by placing the patients in a particular condition favorable to nutrition, the abnormal production of sugar no longer takes place.”

Thus the Vichy waters, in the treatment of diabetes, tend to cure the disease even when employed alone, without any special attention to diet or hygiene, although diet and hygiene require special attention to obtain the full benefit of the waters.

The very first effect of the treatment is to cause the quantity of sugar in the urine to diminish. It is rare that one has to wait for more than a week to see the result, and it may be even remarked from the second day of the treatment. The chemical composition of the urine is at the same time modified and approaches nearer to its normal condition.

The sugar being less abundant, the mechanical and chemical conditions which acted so powerfully in causing the enormous flow of urine are considerably modified and the polyuria decreases or disappears.

The thirst and dryness of the mouth are relieved at the same time and by the same cause. The patient's nights become calmer and he is able to sleep. The skin takes a long time to regain its normal moist condition and healthy action, but this it will do in time, and no longer exhibit a constant tendency to phlegmons and gangrene. The saliva, from being acid, becomes alkaline. The appetite decreases, the food is more easily assimilated, and the general health improves. The patient regains strength, puts on flesh, and loses the feeling of general lassitude which is so usual with diabetic subjects.

It is most exceptional to meet with a case of diabetes which the Vichy waters will not benefit, and still

more exceptional to find a case in which they will do harm.

Thus not only are the symptoms relieved, but the disease is attacked at its very root. The reader may be surprised, on reading the above, to remark that one of the results of the treatment with the Vichy waters is to *decrease the appetite* and to *decrease* the urinary secretion, when we have so often explained in other parts of this work that it *increased* the appetite and secretion of urine. This needs a word of explanation. The considerable appetite and the copious and frequent micturition of the diabetic subject are due to the abnormal production of sugar. The waters by their energetic action in preventing the formation of sugar, react upon the symptoms that the presence of sugar gives rise to, and an exaggerated secretion of urine, as also great hunger, are two marked symptoms of the disease, which are both decreased as the production of sugar decreases.

The waters are taken internally, and also employed externally in the form of douches or baths, or both.

The choice of a spring has a certain importance and must be decided upon only after the physician has studied the whole history of the case, and examined the actual condition of the patient upon his arrival at the springs. The quantity of water to be absorbed, the number and duration of the baths and douches must be prescribed after the same data. We can therefore only give a very general indication on these points.

The Nouvelle Source des Celestins is perhaps the best suited for the generality of cases. Cold, rich in iron and carbonic acid, it exercises both a tonic and exciting influence ; it thus fulfils certain indications in the diabetic treatment where the organism is so thoroughly disorganised by an incessant decomposition and has such need of tone and to be sustained.

Special symptoms may require a less exciting spring and derive more benefit from l'Hôpital, which may be taken alone or in conjunction with the previous one. The quantity recommended is from two to eight glasses, according to the susceptibility of the patient. Usually they support pretty considerable quantities of these waters without having any of the inconveniences so liable in some of the other maladies to occur when the waters are taken in large doses. This does not mean that the patient can take an *excess* with impunity, but he will find that his physician, if there is no contra-indication, will prescribe a quantity more nearly approaching eight glasses than two.

Daily mineral baths are necessary, and douches, where they can be borne, will give satisfactory results.

Attention to the diet is of paramount importance, and though we are ignorant on many points concerning diabetes, yet we know that sugar cannot be formed out of nothing, and that the series of substances out of which it can be formed is limited. And though we cannot absolutely succeed in feeding the patient on substances which will not yield sugar we can

supply a nourishing diet furnishing sugar-forming materials in the scantiest proportion, an end best attained by a pure meat diet.

Sugar itself is absolutely to be avoided as well as all substances rich in sugar. Most patients will easily submit to this, but another substance, starch, which, as we have already explained, becomes converted into sugar by the different chemical modifications it undergoes during digestion, has also to be avoided, and proves a great deprivation. Starch constitutes an essential part of most of the common aliments, such as bread, potatoes, and, in general, all aliments formed from cereals.

Bouchardat gives the following list of substances which should be avoided. This list is a long one; we reproduce the principal part of it.

Feculents and sugars, such as sugars, bread made from any of the cereals, pastry, rice, maize and other feculent grains; potatoes, potato starch, arrowroot, sago, tapioca, and other alimentary fecules, or parts of vegetables which contain starch; farinaceous pastes of every kind, such as semolina, maccaroni, vermicelli, &c.; French beans, lentils, beans, chestnuts, radishes, carrots, turnips, and other starchy or sweet roots; all fruits, particularly sweet fruits, such as plums, prunes, apricots, grapes, raisins, figs, pine-apple, pears, apples, melons, &c.; jellies and other sweetened aliments or drinks; honey, milk, beer, cider, new and sweetened wines, aerated waters, lemonade, and other acid drinks, particularly if they are sweetened.

Wheat flour, or flour from any of the cereals, and all starchy substances should be excluded from the sauces, &c.

Meat should be the patient's main food.

Three of the ordinary constituents of meat, gelatine, glycogen, and glycerine, being sugar-formers, the parts of animals containing these should, as far as possible, be avoided.

It is very important, in constructing a diet scale, to give the patient as much variety of form as possible, the basis remaining the same. Bouchardat, in the appendix to his work on diabetes, gives a very long and detailed list of the things suitable for a diabetic subject. Among others we may quote the following :

Beef-tea, soups from meat, cabbage soup, leek soup, soup from gluten paste, &c. ; oysters, all shell fish, shrimps, lobsters, olives, fresh sardines or preserved sardines, butter, all pork-butcher's meat ; beef, veal, lamb, mutton, fresh pork, roasted pork, pork prepared with vinegar, kidneys, brain, chicken, capon, turkey, duck, duckling, pigeon ; chicken salad with mayonnaise sauce, partridge, quail, hare, rabbit, deer ; all fish with caper sauce or prepared with oil, butter, or fine herbs ; fresh eggs, poached eggs, omelet ; artichokes, cauliflower, Brussels sprouts, lettuce, green French beans, asparagus, spinach, truffles, cucumbers. Lettuce salads, chicory or cress salads : oil and cream should form a large percentage of their seasoning ; the vinegar should be scanty and replaced by wine. Cream cheese without sugar ; Brie cheese,

Gruyère, Roquefort, Parmesan, Cheshire and Stilton cheese ; almonds, walnuts, cob nuts, &c.

As a general rule all green vegetables, or the green parts of vegetables, may be eaten. There are certain exceptions to this, however ; thus the green parts of asparagus and celery may be employed, whilst the white portion should be discarded ; green artichokes may be used, but Jerusalem artichokes are dangerous.

Rinsing the mouth with iced water will often give more relief than a hearty draught, but there is no objection to drink water to any extent, and it is useless to resist slaking the thirst, for by absorbing water the dehydration of the tissues is prevented and the elimination of sugar facilitated.

Champagne, ginger beer, lemonade, porter, stout, rum, and gin must be avoided. Whisky is the least dangerous of all spirits and may be employed in moderation.

Three substances are recommended as substitutes for bread and potatoes :—Gluten bread, bran bread, and almond bread. The two first soon become almost insupportable to the patient, and it may be found necessary to allow him to partake of a little bread toasted hard or torrefied before entirely forbidding the use of bread.

Almond cakes were introduced by Dr. Pavy and are much appreciated by the majority of patients. To obtain a palatable, nourishing, and, at the same time, inoffensive substitute for bread was Dr. Pavy's desire in introducing this kind of food. They are

prepared in different forms—as biscuits or cakes—keep without spoiling for a long time, and appear to be a great improvement upon the ordinary gluten bread. They are composed of eggs and bleached sweet almonds reduced to powder, carefully washed, and the small quantity of sugar they contain removed by treating the parts with boiling water, to which a small proportion of tartaric acid has been added.

The patient should not be subjected to this strict diet all at once; it must be enforced gradually. The sugar, bread, and potatoes will be the first substances to put away; the rest of the forbidden articles will follow in their turn. The patient must on no account be disgusted with his food; to avoid this constant change is necessary, and the range of aliments that may be used with impunity renders this a comparatively easy task. When convalescence begins, and the urine has for some time been free from sugar, the diet may be gradually relaxed, beginning with the substances containing little starch or sugar, gradually extending to bread in small quantity. Potatoes should come last, sugar itself never should be taken.

Exercise is essential, whether it be walking, driving, or riding, but it must not be carried to excess so as to cause fatigue. By exercise a larger quantity of oxygen is absorbed and the combustion is accelerated; more sugar is consequently consumed and one of the primary indications of the treatment realised. Gymnastics, cricket, lawn tennis, swimming, are all useful in moderation and have the same effect upon the

internal combustion. In these exercises, however, and, in fact, on all occasions, great care must be taken to avoid chills. Wet feet, damp and cold, must be strenuously guarded against. The patient would do well to constantly wear flannels, which should be changed after the slightest exposure to damp, as a very little will suffice to give rise to a very serious pneumonia in the case of a diabetic subject.



PART II.



CHAPTER I.

GENERAL INFORMATION.

MANY of our countrymen take Vichy on their way south or when returning from the south of France, and for them it may not be amiss to give an idea of the train service between Vichy and some of the principal towns of that region. The hours mentioned are liable to slight alterations, but we think that they will generally be found correct. When starting from Paris the departure is from the Paris-Lyon-Méditerranée Railway Station, Ligne du Bourbonnais. With one or two exceptions all trains stop at St. Germain-des-Fossés (direct train to and from Lyons), where travellers must change carriages and wait about half an hour before proceeding on their journey. The station is commodious and has a very good buffet. It is here that one should breakfast or lunch, as the case may be, there being ample time for so doing. In returning from Vichy the train only stops a few minutes. The distance between Vichy and St. Germain-des-Fossés is 18 kilometres. The time occupied in the journey is 15 minutes. There is no intermediate station.

Before arriving at Vichy it is as well to have secured

apartments in advance, more particularly during the height of the season, July and August, otherwise a deal of disappointment and annoyance may result.

TRAIN SERVICE.

Vichy to Paris.

1 2 3	Exp.	1 2 3	Exp.	Exp.
a.m.	a.m.	a.m.	p.m.	p.m.
Dep. 5.5	... 10.5	... 8.56	... 9.30	— ... 9.30
Arr. 4.50	... 5.57	... 9.32	... 9.1	— ... 5.15
	p.m.	p.m.	p.m.	a.m. a.m.

Paris to Vichy.

1 2 3	Exp.	Exp.	Exp.	1 2 3
p.m.	a.m.	p.m.	a.m.	a.m.
Dep. 6.5	... 9.10	... 8.7	... —	... 7.30
Arr. 4.29	... 4.52	... 4.29	... —	... 9.3
	a.m.	p.m.	a.m.	p.m. p.m.

Vichy to Lyons.

1 2 3 class.	1 2 3 class.	1 2 3 class.
Vichy ... Dep. 5.5 a.m. ... 8.56 a.m. ... 2.10 p.m.		
Lyons ... Arr. — p.m. ... 1.48 p.m. ... 8.30 p.m.		

Lyons to Vichy.

1 2 3 class.	1 2 3 class.	1 2 3 class.
Lyons ... Dep. 8.30 a.m. ... 3.30 p.m. ... 3.55 p.m.		
Vichy ... Arr. 3.32 p.m. ... 9.3 p.m. ... 10.42 p.m.		

Vichy to Clermont-Ferr.

1 2 3 cl. a.m.	1 2 3 cl. a.m.	1 2 3 cl. p.m.	Exp. p.m.	1 2 3 cl. p.m.
Dep. 7.0 ...	8.56 ...	2.10 ...	3.58 ...	7.53
Arr. 9.54 ...	12.45 ...	5.17 ...	5.38 ...	10.35

Clermont-Ferr to Vichy.

1 2 3 class. a.m.	1 2 3 class. p.m.	1 2 3 class. p.m.	1 2 3 class. p.m.
Dep. 7.25 ...	12.25 ...	5.34 ...	8.0
Arr. 9.45 ...	3.32 ...	9.3 ...	10.42

Vichy to Thiers.

1 2 3 cl. a.m.	1 2 3 cl. a.m.	1 2 3 cl. p.m.	1 2 3 cl. p.m.	(Excursion.)
Vichy ... Dep. 4.45 ...	11.29 ...	5.5 ...	12.25	
Thiers... Arr. 6.20 ...	1.14 ...	6.57 ...	1.38	

Thiers to Vichy.

1 2 3 class. Thiers... Dep.	1 2 3 class. 7.5 a.m. ...	1 2 3 class. 11.56 p.m. ...	7.36 p.m.
Vichy ... Arr. 8.51 a.m....	1.54 p.m....	9.17 p.m..	

Vichy to Marseilles, Nice, and Vintimille.

	1st class. By Lyons.	1 2 3 class. By Langeac.
Vichy Dep.	8.56 a.m. ...	3.58 p.m.
Marseilles ... Arr.	4.23 a.m. ...	8.18 a.m.
Nice Arr.	3.7 p.m. ...	5.19 p.m..
Vintimille ... Arr.	4.57 p.m. ...	7.14 p.m.

Vintimille, Nice, Marseilles to Vichy.

			1 2 3 class.
Vintimille	...	Dep.	11.55 a.m.
Nice	...	Dep.	7.41 p.m.
Marseilles	...	Dep.	9.49 p.m.
Vichy	...	Arr.	3.32 p.m.

Vichy to Nîmes and Cette.

By Clermont-F.	Express.	By Lyons.	1 2 3 class.
Vichy	... Dep.	3.58 p.m.	Vichy ... Dep. 8.56 a.m.
Langeac	... Arr.	8.20 p.m.	Lyons ... Dep. 1.48 p.m.
Langogne	... Arr.	10.30 p.m.	Nîmes ... Arr. 2.57 p.m.
Nîmes	... Arr.	2.42 a.m.	Cette ... Arr. 5.11 p.m.
Cette	... Arr.	5.11 a.m.	

Cette and Nîmes to Vichy.

			1 2 3 class.
Cette	... Dep.	10.40 p.m.	... 3.25 a.m.
Nîmes	... Dep.	12.34 p.m.	... 7.21 a.m.
Langogne	... Dep.	4.56 a.m.	... 1.35 p.m.
Langeac	... Dep.	6.45 a.m.	... 3.53 p.m.
Vichy	... Arr.	11.19 a.m.	... 10.42 p.m.

Vichy to Bordeaux.

(By Montluçon.)

		1 2 3 class.	1 2 3 class.
Vichy	... Dep.	8.56 a.m.	... 7.53 p.m.
Gannat	... Arr.	11.21 a.m.	... 8.58 p.m.
do.	... Dep.	11.40 a.m.	... 9.20 p.m.

			1 2 3 class.		1 2 3 class.
Montluçon	...	Arr.	1.44 p.m.	...	11.16 p.m.
do.	...	Dep.	1.50 p.m.	...	11.28 p.m.
Guéret	...	Arr.	4.15 p.m.	...	1.27 a.m.
do.	...	Dep.	4.17 p.m.	...	1.31 a.m.
Limoges	...	Arr.	6.22 p.m.	...	3.20 a.m.
do.	...	Dep.	6.45 p.m.	...	3.27 a.m.
Périgueux	...	Arr.	9.11 p.m.	...	5.25 a.m.
do.	...	Dep.	9.19 p.m.	...	5.33 a.m.
Coutras	...	Arr.	11.2 p.m.	...	7.13 a.m.
do.	...	Dep.	11.8 p.m.	...	7.17 a.m.
Bordeaux	...	Arr.	12.25 p.m.	...	8.23 a.m.

Bordeaux to Vichy.

(By Montluçon.)

			1 2 3 class.		1 2 3 class.
Bordeaux	...	Dep.	9.0 p.m.	...	7.30 a.m.
Coutras	...	Arr.	9.55 p.m.	...	8.25 a.m.
Do.	...	Dep.	10.0 p.m.	...	8.30 a.m.
Périgueux	...	Arr.	11.46 p.m.	...	10.12 a.m.
Do.	...	Dep.	11.53 p.m.	...	10.21 a.m.
Limoges	...	Arr.	2.5 a.m.	...	12.44 p.m.
Do.	...	Dep.	2.14 a.m.	...	12.53 p.m.
Guéret	...	Arr.	4.8 a.m.	...	3.25 p.m.
Do.	...	Dep.	4.10 a.m.	...	3.28 p.m.
Montluçon	...	Arr.	6.8 a.m.	...	5.53 p.m.
Do.	...	Dep.	6.18 a.m.	...	6.10 p.m.
Gannat	...	Arr.	8.18 a.m.	...	8.28 p.m.
Do.	...	Dep.	8.38 a.m.	...	8.53 p.m.
Vichy	...	Arr.	9.45 a.m.	...	10.42 p.m.

RAILWAY FARES FROM THE FOLLOWING TOWNS
TO VICHY.

Single Fares.

	1st class. Francs.	2nd class. Francs.	3rd class. Francs.
Aix-les-Bains . .	35·50	26·65	19·55
Avignon . .	48·65	36·50	26·75
Boulogne-sur-Mer.	76·30	57·25	42·5
Calais . .	81·60	61·20	45
Cannes by Lyons .	87·30	65·45	48·5
Clermont-Ferrand .	8·85	6·65	4·85
Dieppe . .	65·70	49·80	36·20
Geneva . .	40·70	30·50	22·40
Havre . .	73·15	54·85	40·30
Hyères by Lyons .	74·20	55·65	40·85
Lyons . .	20·15	15·15	11·15
Mâcon . .	25·10	18·85	13·85
Marseilles . .	63·40	47·60	34·90
Meaux . .	49·45	37·30	27·15
Melun . .	39·60	29·70	21·80
Menton . .	94·5	70·60	51·80
Monaco . .	92·95	69·75	51·15
Montpellier by Lyons	61·60	45·55	33·40
Nice by Lyons .	91·10	68·40	50·15
Nîmes by Lyons .	54·55	40·95	30·5
Orleans . .	33·65	25·25	18·60
Paris . .	45·5	33·80	24·85
Perpignon . .	72·85	54·70	40·5
Poitiers . .	42·75	32·15	23·50
Rouen . .	61·80	46·30	34·5
Royat . .	9·35	7·10	5·10
Toulon by Lyons .	71·65	53·75	39·45
Toulouse . .	56·80	42·65	31·30

Return Fares.

		1st class. Francs.	2nd class. Francs.	3rd class. Francs.	Kilo- metres.
Clermont-Ferrand	.	12·60	9·40	6·80	70
Créchy	.	3·40	2·50	1·80	18
Gannat	.	5·70	4·30	3·20	31
Lyon-Perrache	.	29·90	22·40	16·50	174
Moulins-sur-Alliers	.	9·60	7·20	9·30	52
Palisse-La	.	5·20	3·90	2·90	28
Puy Guillaume	.	3·90	3	2·20	21
Riom	.	10·90	8·10	5·90	58
Ris-Chateldon	.	2·80	2·10	1·50	15
St. Galmier	.	24·30	18·30	13·50	136
St. Germain-des-Fossés	.	1·90	1·40	1·10	11
St. Rémy	.	2·40	1·80	1·40	13
St. Yorre	.	1·70	1·30	·90	9
Thiers	.	7·10	5·30	3·90	38
Villars	.	24·30	18·30	13·50	137

The fares from Paris to Vichy are: 1st class, 44 f. 95 c.; 2nd class, 33 f. 55 c.; 3rd class, 24 f. 65 c.

The Vichy station is situated at the extremity of the Rue de Paris. Omnibuses from the hotels await the arrival of all the trains. Cabs are also easily obtainable. An omnibus in connection with the railway goes to every part of the town. The hotels charge for the use of their omnibus from 75 c. to 1 f. 50 c. The railway omnibus fare is 30 c. and 25 c. for each trunk.

The cab fares are as follows for the town :

	From 6 a.m. to 12 p.m.	From 12 p.m. to 6 a.m.		
	Course.	Hour.	Course.	Hour.
One-horse fly .	1 f. 25 c.	2 f. 25 c.	2 f.	3 f.
Two-horse fly	2 f.	3 f.	2 f. 60 c.	3 f. 50 c.

The majority of the hotels at Vichy are very good, and they vary in price according to the quarter in which they lie.

The best are situated on the sides of the Old Park ; their prices vary from 10 to 20 f. a day. The cheaper hotels are in proximity to the station, where one can get board and lodging from 7 to 10 f. per day. Candles are generally charged from 50 to 75 c., but generally the former price.

It may not be out of place to put the traveller upon his guard against the hotel touts who meet the different trains at St. Germain-des-Fossés, and, passing themselves off as being travellers also, recommend hotels which they pretend they are going to. Unfortunately, the number of these touts is legion, though it is unnecessary to say that none of the respectable hotels employ these gentry as a means of obtaining custom.

Should the visitor prefer a quieter life to that of the hotel he will find a number of first-class boarding houses in the town ; and if he should prefer a house to himself many pretty and most elegant villas are constantly to be had. What he will have more difficulty in obtaining is *unfurnished* apartments, as everyone in Vichy who holds house property and wishes to rent it for the season commences by stocking it with furniture of a more or less substantial char-

acter. In any case we would recommend taking a room temporarily in an hotel so as not to rent in haste and repent in leisure. Let the traveller look especially to the installation of the w. c.; frequently it is in the court or garden, and even when inside the house is not always in the most sanitary of conditions.

As it very often happens that visitors have letters awaiting them poste restante, and are anxious to obtain their letters at once, before closing this chapter we will give them the hours for the delivery and the clearing of the letter boxes.

Post and *Telegraph* are united in one building on the Boulevard de l'Hotel de Ville, at the back of the Hotel des Ambassadeurs.

The telegraph office is open from 7 a.m. until 11 p.m.

The post-office from 7 a.m. until 9 p.m.

The first distribution of letters is at 6 a.m., the second at 11 a.m., and the last at 5.45 p.m., the first and second distribution being the foreign mails.

The boxes are cleared as follows :

Town.	Gen. Post.	For the direction of
-------	------------	----------------------

—	... 3.50 a.m.	Cusset, Busset, Ligne de Thiers, and St. Etienne.
---	---------------	---

7.45 a.m.	... 8.25 a.m.	Cusset, Moulins, Paris, Clermont, Lyons.
-----------	---------------	--

12.0 a.m.	... 1.45 p.m.	Cusset, Moulins, Dijon, Lyons, Marseilles, Clermont.
-----------	---------------	--

—	... 4.25 p.m.	Basset (Ligne de Thiers).
---	---------------	---------------------------

Town.	Gen. Post.	For the direction of
7.0 p.m. ...	7.15 p.m.	Limoges, Perigueux, Charentes, Bordeaux, Pyrénées.
—	... 8.45 p.m.	Paris, France, and foreign mails.

A final clearing at the Vichy Station at 9 p.m.

The second and sixth clearings are for the foreign mails. The Casino clears its box about ten minutes after the hour for the general post.

When the invalid has settled upon his quarters his first care should be to call upon the physician he intends to consult so as to lose no time in commencing his treatment. As a general rule the doctor visits the patient early the following morning, and sees him in his bed ; he is thus able to make a thorough examination, and to institute at once a proper treatment. When possible, it is advantageous that the patient should bring a letter from the physician who has been previously attending him, so that any obscure points in the diagnosis of the case may have special attention.

Should the patient not be recommended to any medical man in particular he will do well to keep clear of the touts that certain doctors largely employ, and who infest the hotels and even assail the traveller at the railway station. That such a state of things should exist is a disgrace to the profession, but the public who allow themselves to be entrapped by them must be deficient in the most ordinary common sense,

for if they gave themselves the trouble to think they would perceive at once that anyone employing such unworthy ways of obtaining clients could not be worthy of their confidence.

One of our much respected colleagues, who has been in practice over fourteen years at this station, wrote rather strongly on this subject quite recently. We quote him : (translation.)

"There is an ugly sore in Vichy ; the *touting*, of which one cannot be too careful. Vainly has one tried to eradicate it ; but it shoots up constantly afresh, as do certain parasites affecting the dirty poor.

"The touts have orders from some of the hotel keepers to bring them, for a certain consideration, clients, doomed to be fleeced, to the disadvantage of respectable houses where the visitor could put up in perfect confidence.

"There are even three or four doctors who have recourse to this becoming procedure. As the person who gulls has a percentage upon every head one can understand the value of his information. This is not all ; this miserable individual (the tout), generally in low circumstances, desires ardently to win daily the fairly high remuneration that Mr. X—or Mr. Y—allows him. Therefore nothing stops him, not even calumny, to prevent the unfortunate dupe who listens to him from going straight on his road. I am always surprised that there should be such simple-minded folk who will listen to the first person they meet rather than to their usual adviser, who is

worthy of their confidence and who has given them a letter of introduction for a doctor whom he knows.

"No belief should be attached to the information of these touts, and should they become importunate they should be handed over to the police, &c."

Fortunately for the invalid the list of honorable and capable physicians is a long one, and year by year it increases in the same ratio as that of the visitors, whose number has more than doubled since 1870. We give a table showing the progression of strangers coming to Vichy from 1821 to 1886.

Years.	Number.	Years.	Number.
1821	335	1838	1940
1822	420	1839	2230
1823	375	1840	2543
1824	470	1857	9922
1825	444	1841	2573
1826	390	1842	3062
1827	426	1843	3211
1828	429	1844	4012
1829	559	1845	4126
1830	418	1846	4666
1831	387	1847	4872
1832	504	1848	2352
1833	575	1849	5840
1834	515	1850	6709
1835	853	1851	6954
1836	1013	1852	6823
1837	1342	1853	6653

Years.	Number.	Years.	Number.	
1854	7802	...	1871	17,209
1855	8882	...	1872	25,524
1856	9626	...	1873	25,483
1858	11,918	...	1874	26,145
1859	12,909	...	1875	28,777
1860	12,690	...	1876	30,177
1861	16,044	...	1877	28,065
1862	17,401	...	1878	30,833
1863	19,625	...	1879	33,805
1864	20,673	...	1880	37,067
1865	19,092	...	1881	40,058
1866	21,357	...	1882	42,702
1867	20,599	...	1883	43,314
1868	22,939	...	1884	34,841
1869	23,262	...	1885	46,477
1870	17,035	...	1886	

These figures are composed of all nationalities, the French naturally forming the bulk, the English coming next; these are the official figures for 1885:—

Americans	497	Brought forward	4917
English	2103	Portuguese	71
Germans	114	Russians	421
Belgians	64	Swiss	92
French Colonists	123	Turks	14
Egyptians	31	French	41,568
Spaniards	1754	Total	47,083
Italians	231		

The English are less numerous than they were ten years ago ; why, it is not very easy to understand, for the waters have not lost any of their reputation ; on the contrary, they have never been held in greater favour by the medical profession than they are now.

The physician usually commences the treatment by ordering a certain quantity of mineral water to be drunk daily ; he indicates the springs, and if he judges it necessary, orders at the same time bathing or douching and internal treatment.

The State possesses at Vichy five natural springs and five artesian wells.

Natural springs.—Grand Grille, Puits Chomel, Hôpital, Lucas, Ancient Spring of Celestins.

Artesian wells.—Grotto of the Celestins, New Spring of Celestins, Parc, Mesdames, Hauterive.

The private springs are :

Lardy, Larbaud aîné, Vesse, Prunelle, Dubois.

Ste. Marie, Ste. Elisabeth, Tracy, Ste. Jean, at Cusset.

Larbaud, Mallat, Guerrier, Forrissier, at St. Yorre.

Charnaux at Abrest.

To these springs are attached “buvettes,” and at almost all of them the water drunk at the fountain is gratuitous. When the patient goes to the spring indicated he will find women employed in serving out the water. Most bathers have their own glasses, which are made to hold a stipulated quantity. They can be purchased at the wells, or at most of the chemists’ shops. If the bather does not wish to take his glass away, it is usual to give it to the person who

has been serving him during his stay and at the same time to give a gratuity. This gratuity is also expected at the bathing establishment.

The drinking commences at 5 a.m. and continues till 7 p.m. at all the springs. Usually it is from 9 to 10 in the morning, and from 3.30 to 5 p.m. it ceases, that is to say, an interval of about half an hour should elapse after the drinking before taking meals. Water may be taken away from the springs gratuitously if put into decanters, and can be used during meals mixed with wine if so ordered, but no one is allowed to fill bottles.

Before describing what is to be seen in the town we will give a few tables for the reader's benefit.

KILOMETRIC AND METRIC TABLES.

For those of our readers who may wish to know the exact equivalents of the kilometre to the mile we append the following table. Roughly speaking a kilometre is $\frac{5}{8}$ of an English mile, 10 kilometres 6 miles, 16 kilometres 10 miles ; the metre is nearly $1\frac{1}{10}$ yard, and 10 metres nearly 11 yards.

Table of Metres, Yards, and Feet.

Metres.		Yards.		Feet.
1	=	1.09	=	3.281
2	=	2.18	=	6.562
3	=	3.27	=	9.843
4	=	4.36	=	13.123
5	=	5.45	=	16.404
6	=	6.54	=	19.685

Metres.		Yards.		Feet.
7	=	7·63	=	22·966
8	=	8·72	=	26·247
9	=	9·81	=	29·527
10	=	10·936	=	32·809
11	=	12·3	=	36·9
12	=	13·12	=	39·37
13	=	14·22	=	42·65
14	=	15·31	=	45·93
15	=	16·4	=	49·21
16	=	17·5	=	52·49
17	=	18·59	=	55·76
18	=	19·68	=	59·6
19	=	20·78	=	62·34
20	=	21·87	=	65·618
30	=	32·81	=	98·427
40	=	43·74	=	131·236
50	=	54·68	=	164·45
60	=	65·616	=	196·84
70	=	76·58	=	229·66
80	=	87·49	=	262·47
90	=	98·42	=	295·28
100	=	109·36	=	328·9
200	=	218·72	=	656·18
300	=	328·8	=	984·27
400	=	437·44	=	1312·36
500	=	546·8	=	1640·45
600	=	656·16	=	1968·54
700	=	765·52	=	2296·63
800	=	874·88	=	2624·72
900	=	984·24	=	2952·81
1000	=	1093·63	=	3280·9
8000	=	5 miles nearly		

Table of Kilometres and English Miles.

Kils.	Miles.	Miles.	Kils.		
1	=	0·621	1	=	1·609
2	=	1·242	2	=	3·219
3	=	1·863	3	=	4·823
4	=	2·484	4	=	6·437
5	=	3·105	5	=	8·047
6	=	3·726	6	=	9·66
7	=	4·347	7	=	11·27
8	=	4·968	8	=	12·87
9	=	5·589	9	=	14·48
10	=	6·21	10	=	16·9
11	=	6·831	11	=	17·7
12	=	7·453	12	=	19·31
13	=	8·074	13	=	20·92
14	=	8·695	14	=	22·53
15	=	9·316	15	=	24·15
16	=	9·937	16	=	25·76
17	=	10·558	17	=	27·37
18	=	11·179	18	=	28·98
19	=	11·8	19	=	30·59
20	=	12·421	20	=	32·2
30	=	18·63	30	=	48·28
40	=	24·84	40	=	64·37
50	=	31·5	50	=	80·47
60	=	37·26	60	=	96·56
70	=	43·47	70	=	112·65
80	=	49·68	80	=	128·75
90	=	55·89	90	=	144·84
100	=	62·6	100	=	160·93
200	=	124·2	200	=	321·86
300	=	186·3	300	=	482·79
400	=	248·4	400	=	643·72
500	=	310·5	500	=	804·66
600	=	372·6	600	=	965·59
700	=	434·7	700	=	1126·52
800	=	496·8	800	=	1287·45
900	=	558·9	900	=	1448·38
1000	=	620 1	1000	=	1609·31

To reduce the Centigrade thermometric scale to Fahrenheit you must multiply the number by 9 and then divide by 5 ; to the sum thus found add 32 if the Centrigrade number be above 0, as the French or Centrigrade freezing point is 0° , whereas it is 32° Fahr. English. For example, suppose you wish to find the Fahr. equivalent of 35° Centigrade :

$$35 \times 9 = 315 \div 5 = 63 + 32 = 95.$$

To obtain the Fahr. equivalent in Centigrade the reverse operation has to be performed. Deduct 32 if the number be above 32, multiply the remainder by 5 and divide by 9. Take 104° Fahr., for example, to be reduced into Centigrade :

$$104 - 32 = 72, 72 \times 5 = 360, 360 \div 9 = 40^{\circ}.$$

Thermometers.

Reamur.	Centigrade.	Fahrenheit.
80°	100°	212°.....Boiling point for water.
76	95	203
72	90	194
68	85	185
63½	79½	174
60	75	167
56	70	158
52	65	149
48	60	140
44	55	131
43	53	127
40	50	122
36	45	112—3
32	40	104
29	37	98.....Blood heat.
28	35	95

Reaumur.	Centigrade.	Fahrenheit.
24	30	86
20	25	77
19	24	76
16	20	68
12	15	59
10	13	55.....Temperate.
8	10	50
1½	2	35
0	0	32.....Freezing point for water.
-4	-5	23
-5½	-7	20
-8	-10	14
-10	-12½	10
-12	-15	5
-14	-18	0
-16	-20	-4
-19	-24	-10
-20	-25	-13
-24	-30	-20

The barometrical table may also prove useful :

Barometer Table, French and English.

Millimetres.	Inches.	Millimetres.	Inches.
715	= 28·15	... 755	= 29·73
720	= 28·35	... 760	= 29·92
725	= 28·54	... 765	= 30·12
730	= 28·74	... 770	= 30·32
735	= 28·94	... 775	= 30·51
740	= 29·13	... 780	= 30·71
745	= 29·33	... 785	= 30·91
750	= 29·53	... 790	= 31·10

Table for intermediate heights—to be added to the above :

Mill.	Inches.	Mill.	Inches.
1	= .039	...	4 = .158
2	= .079	...	5 = .197
3	= .118	...	

The French currency is still a subject of so much bewilderment to some of our compatriots as to make an apology unnecessary for introducing this table of equivalents.

If you remember that 4s. is equal to 5 f., and 1s. to 1 f. 25 c., that 50 c. is equal to 5d., and 1f. to 9½d, you will be able to calculate any sum.

Description of coin.	Value in English Sovs.	United States.	France, Belgium, Switzerland	German Empire.	Holland.
GOLD.					
English Sovereign	1 0 0	4 88	25 20	20 38	12 6
Twenty Franc Piece.....	0 15 10	3 85	20 0	16 13	9 50
German 20 Mark Piece ...	0 19 6	4 74	24 70	20 0	11 80
Dutch 10 Florins	0 16 4	3 96	20 80	16 60	10 0
Half Imperial (Russian)...	0 16 3	3 97	20 50	16 50	9 80
Twenty Kroner (Swedish, Norwegian and Danish)	1 1 9	5 25	27 40	22 20	13 10
Alfonso (5 dolls. Spanish)...	0 19 8	4 80	24 80	19 45	11 90
Eagle (5 dolls. U.S.).....	1 0 6	5 0	25 85	20 90	12 40
SILVER.					
English Shilling	0 1 0	0 24	1 25	1 0	0 60
Five Franc Piece	0 3 11½	0 95	5 0	4 0	2 37½
One Franc Piece	0 0 9½	0 19	1 0	0 80	0 47½
Thaler = 3 Marks.....	0 2 11	0 70	3 65	3 0	1 76
One Mark	0 0 11¾	0 24	1 22	1 0	0 59
One Florin (Dutch)	0 1 7¾	0 40	2 5	1 70	1 0
One Kroner (Danish, Swed- ish, and Norwegian).....	0 1 1	0 27	1 30	1 13	0 66
One Dollar (Spanish)	0 3 11	0 94	4 95	3 98	2 35
One Peseta (Spanish)	0 0 9½	0 19	0 95	0 70	0 46
One Dollar (U.S.)	0 4 1	1 0	5 10	4 10	2 46

CHAPTER II.

THE TOWN OF VICHY.

THERE are very few monuments or buildings of historic interest to be seen here, and what is to be seen is quickly got over.

We will take the visitor rapidly through the town, then through the parks, and close this chapter with an account of the available amusements. The thermal establishment and the Casino will form matter for a separate chapter.

Before, however, touching upon the sights, it may be of interest to the visitor to know how the day is usually employed. Early rising is compulsory. Some people get up as early as 4 a.m., if they have to bathe in an early series, though of course the programme followed by an invalid is different from that which a tourist would wish to follow. We suppose the visitor to be under treatment.

From 6 to 8.30 a.m. drinking at the wells and bathing; walk in the parks in the intervals until 8.30, when the first morning concert takes place in the Old Park, at the Kiosque of the Casino. This concert

lasts until 9.30 a.m. After or during the concert return to the springs. At 10 a.m. breakfast, which lasts about one hour. From 11 to 2.30 p.m. attend to correspondence, go to reading-room at Casino, or repose in hotel. At 2.30 attend the afternoon concert in the Old Park. This is the time of the day that ladies enjoy the most, for it is then that all the most elegant toilets are to be seen, and there is no place that can surpass Vichy for extravagance in dress. In our humble opinion it is carried to a ridiculous excess ; but be that as it may, it is the fashionable hour for promenading about and meeting friends and gossiping. The concert is over about 3.30 p.m., when a return is made to the wells, and the prescribed quantity of water imbibed. As the waters are only taken in fractional doses, the parks are again frequented, or the benches of the gallery of the thermal establishment if it be a rainy day. The central alley of the Old Park on a fine day will be crowded. The dinner hour is 5.30 p.m. This meal is over in an hour.

The evening can be spent in many ways. In the Casino, at the theatre, restaurant, café, or Eden Theatre, or in taking a quiet stroll in the parks.

As the morning begins so early, it is usual for those people who do not care for the theatre to retire to rest about 10 p.m. We would remark, however, that generally speaking, the theatricals and operas given at the Casino commence at 7.30 or 8 p.m. and are over at 10 or 11 p.m. With the name of the play for the evening is always given the hour when the piece will

be over, so that those who do not wish to sit up late can always choose a piece that ends early.

Boulevards.

Right and left of the railway station are fine boulevards, which form a circle round the town. To the right the Avenue Victoria, to the left the Boulevard des Celestins. The Boulevard National unites the Boulevards des Celestins and Victoria. Parallel with and exterior to the Boulevard Victoria is the Boulevard de Ceinture by the side of the Sichon. The Avenue de la Gare leads into the middle of the town, passing by the side of the market, and ends in the Rue de Nîmes, a street that runs right through the centre of the town.

The Boulevard National forms the outer boundary of the New Park, and is flanked on either side by elegant villas. The Boulevard Victoria, where nearest to the Boulevard National, has also many pretty villas, but as it approaches the railway station it loses much of its prettiness.

La Vieille Tour or the *Tour de l'Horloge* (Clock Tower) is in the old town of Vichy, just off the Place de la Mairie, and close to the Boulevard des Celestins. It is the only historical monument to be found in Vichy. In olden times it formed part of a castle built by Louis II in the fifteenth century, and it is the only vestige of the castle that remains. The name of

"Clock Tower" was given to it from the clock that was placed on it. A good view is obtained from the top of the town of Vichy, the New Park, and the valley of the Allier. A small gratuity is expected by the custodian.

La Maison du Bailliage, quite close to the tower in the Rue Verrier, dates from the sixteenth century. It was built in 1581 by the Gravier family, and all that now remains for the antiquarian to admire is the entrance door and the beautiful corkscrew staircase.

Le Pavillon Sévigné.—The house that Madame de Sévigné occupied is situated within a couple of minutes' walk of the *Maison du Bailliage*, between the Place de la Mairie and the Boulevard des Celestins, and has been given its present name to perpetuate the fact of Madame de Sévigné having lived there. Very little remains here of the furniture or accessories used by this good lady. One or two pieces of old furniture and the old chimney is all that is now to be shown. As for the house itself, it presents but little to attract the attention.

Le Couvent des Celestins.—Hardly any traces remain. Part of one of the wings has been converted into a house for the gardener attached to the *Parc des Celestins*, and another part is used as a place for preserving the orange-trees. The Convent has played such an important part in the history of Vichy that these remains are worth visiting.

Le Château d'Eau, situated in the Place du Château d'Eau (by the Rue de Nîmes), is the name

given to a fountain built in the sixteenth century. It is massive and heavy, but presents no artistic beauty.

A walk through the old town is not without interest, for although so very little of what is historic remains to be seen, the old houses and irregular streets have a certain charm.

Churches.

Saint Blaise.—Is in the old town, and was the only Catholic church in Vichy before the building of the new Catholic church of Saint Louis. It is small, dark, and presents no architectural beauties. Lately it has been partially restored.

Église St. Louis.—In the middle of the Rue de Nîmes was commenced in 1861 and was a gift of Napoleon III to the town. Owing to the rapid increase of the population, and the greater number of strangers that year by year flocked to this watering station, the church accommodation had become inadequate. It is a striking building, constructed in the Roman style, but appears to be much wanting in many points of architecture. It is divided into three naves, and is seventeen yards wide. Its two towers serve as a landmark when at some distance from the town.

English Protestant Church.—Is situated in the Market Place. Very simple in construction, devoid of all beauty. Inside, the usual pews are replaced by chairs. The Colonial and Continental Church Society sends an English minister here during the season, but there is

no regular clergyman attached to it, and it frequently happens that there is no service for want of a minister. The English services are at 11.30 a.m. and 7.30 p.m. The Sacrament is administered every Sunday after morning service. In the afternoon there is a French Protestant service.

Synagogue.—For persons of the Jewish persuasion, on the Boulevard de l'Hôtel de Ville, in the Hôtel des Colonies. Service on Friday at 7 p.m. and on Saturday at 8 a.m.

Chapelle de l'Hôpital.—Place Rosalie.

Chapelle des Franciscaines.—Rue de la Chaume.

Hôtel de Ville (Town Hall).—Facing the Place de l'Hôtel de Ville, close to the New Park and Casino. A most unpretending building, without any attempt at ornamentation. Here the “civil marriages” are celebrated. It contains a public library and council chamber.

At one side of the building is the office of the Commissary of Police.

Pont de l'Allier.—A handsome bridge crosses the Allier. The former bridges had frequently been swept away by the force of the stream when the river was in flood. After an accident of this kind on the 27th of September, 1866, a temporary bridge was constructed and the foundation of the present bridge laid in 1868. This was finished and opened to the public on the 20th May, 1870.

From the bridge one admires the fine quay, 1900 metres long and 5 yards high, in the form of a half

circle, which was constructed to prevent the frequent inundations that this capricious river used to give rise to.

Hôpital Civil.—Place de Rosalie or de l'Hôpital, near to the spring of the same name.

The Civil Hospital was founded in the seventeenth century. Since its foundation it has been considerably enlarged, and is now composed of three distinct parts : 1, civil hospital ; 2, home ; 3, thermal hospital.

1. The civil hospital, which remains open the whole year, is designed for the poor and indigent people inhabiting the sixteen parishes round Vichy.

2. The home (hospice) affords shelter to twenty-six old persons and fifty-six children of both sexes belonging to the same parishes.

3. The thermal hospital is only opened during the season, from May 15th to September 30th, during which time it places eighty beds at the disposal of poor invalids living in the various Departments. To obtain admission it is necessary that the invalid procure a certificate from the prefect of his Department certifying to his indigence and setting forth the nature of his malady. He then obtains a bed when there is a vacancy.

The hospital has two doctors attached to it, a senior and a junior.

The hospital comprises a chapel, largely frequented by the bathers, at which a service commences at 5 a.m. ; and also a gratuitous school for girls under the direction of the Sisters of St. Vincent-de-Paul.

Military Hospital.—Is in close proximity to the thermal establishment, at the corner of the Rue Lucas and Rue de Ballore, in front of the Lucas Spring, which supplies it in part. It was constructed in 1847.

The hospital is divided into two principal buildings, one for the officers and one for the rank and file. The officers have 120 rooms at their disposal, the soldiers 60 rooms.

Besides several rooms for the needs of the service there is a complete hydropathic establishment, with baths, douches, &c. The hospital only receives patients from May 1st to September 30th. The treatment lasts thirty days, so that five series of patients are received during the season, thus permitting of 600 officers and 300 men undergoing treatment during the course of the year.

A head physician has charge of the entire hospital ; he is seconded by other military doctors.

A large barracks with garden is attached to the hospital, and both officers and men have comforts that are rarely to be met with in military hospitals.

Le Vieux Parc.—The Old Park, or, as it is more usually called, *The Park*, is a promenade bounded on two sides by the first-class Thermal Bathing Establishment and the Casino ; on the other sides by the Rue du Parc and the Rue Cunin-Gridaine.

This is the promenade *par excellence* of Vichy. A central alley reunites the Casino and Thermal Establishment. It is liberally supplied with benches and

chairs, and its magnificent chestnut trees, planted in 1861, offer abundant shelter from the sun on a bright day. In the evening it is illuminated by gas lamps which are scattered all over the park.

Besides the Casino and Thermal Establishment, which we describe elsewhere, the park includes : a restaurant, situated at the side of the Casino, called the "Restauration;" a large space devoted to concerts, with two kiosques for the band, and a number of other kiosques for the sale of different articles, the principal ones being those for the sale of artistic porcelain ; the Rotonde for the sale of the Vichy salts and other products of the Vichy Thermal Establishment ; a kiosque for the sale of ladies' fancy work, besides less important ones where one can purchase flowers, newspapers, jewellery, &c.

This promenade is crowded in the early morning when the bathers are all out to drink the prescribed waters, and to walk about or sit and listen to the morning concerts in the intervals between visiting the springs. In the early morning but little attention is paid to dress ; at 10 o'clock, the usual breakfast hour, most of the people return to their hotels, and the park is more or less deserted until 2 p.m.

From 2 o'clock in the afternoon until 5 o'clock (dinner hour) it once more becomes very animated. The afternoon concert lasts from half-past two until half-past four, and during these hours are to be seen the most brilliant and expensive toilets. Drinking is continued during this time, and the park once more

becomes nearly deserted as the dinner hour approaches, to be again frequented in the evening by strollers.

The chairs in the park are free for the subscribers to the Casino ; for others a charge of 10 c. is made.

The streets forming the limits of the park are almost entirely taken up by hotels. These are the dearest hotels in the town, but they are all first class, and largely frequented by the English.

Le Nouveau Parc.—The New Park, so called to distinguish it from the Old Park of more ancient creation, is of far greater dimensions than the Old Park, and in many respects much more agreeable, more particularly for those who have no great desire to see or show off brilliant toilets.

This park stretches for some distance along the banks of the Allier to the right and left of the bridge, on the same bank of the river, and being comprised between this bank and the Boulevards National and des Celestins.

It is laid out somewhat on the plan of an English garden ; numerous shady alleys, green lawns, and flower beds making it a much cooler and more refreshing place to saunter in than the Old Park. There is no lack of seats, and for those who prefer quiet to turmoil and noise it is all that could be wished for.

That part of the park limited by the Boulevard des Celestins is the most frequented because of its proximity to the Celestins springs.

It is to Napoleon III that the town owes this park, for it was he who ordered the necessary works to

redeem this land from the frequent inundation of the river, and who, after having had the magnificent quay constructed, gave directions for the planting of the trees and the laying out of this park.

In the park is a piece of ornamental water, crossed by a rustic bridge, the "Étang aux Cygnes," a "cottage," Punch and Judy show, &c.

Parc Lardy.—Almost touching the New Park, at the junction of the Boulevards National and des Celestins. It is frequented by those who are ordered to drink the Lardy Spring waters.

The park is small but prettily laid out. On the left, near the entrance, is a shop for the sale of pastilles, &c., and a buvette supplied by the Source Lardy.

An establishment of baths is comprised in the park, with an accessory of douches, &c. There are thirty baths for ladies and thirty for gentlemen, also a special service for sulphurous baths.

Parc des Celestins.—Contiguous to the Lardy Park, but differing considerably by the manner in which the grounds are laid out.

It also comprises a hydropathic establishment and three buvettes, supplied by the three Celestins springs, all of which rise from the same rock, which support what remains of the ancient Celestins Monastery—a half-ruined, tumble-down old house.

We will finish this chapter by noticing a few of the other therapeutic establishments to be found in the town.

Etablissement Hydrothérapique of Dr. Lejeune, Rue de

l'Établissement, hot and cold baths, douches, shower-baths, &c. The two following are of the same nature.

Établissement Hydrothérapique of Dr. Versépuy and of Dr. Lugagne, the first in the Rue de Ballore, the second in the Rue Sornin.

Établissement Medical Thermo-Resineux, under the direction of Dr. C. de la Salzède, Boulevard des Celestins.

Le Hammam (Turkish bath).—Rue Burnol. Besides the regular Turkish bath, both mineral and fresh-water baths are to be had here, as well as different medicated baths, such as sulphur, starch, and gelatine baths, also vapour baths. There is a special installation for electric baths, inhalations of oxygen, &c.

Salon de Vichy.—At the commencement of the season of 1886 a picture gallery was opened under the auspices of the Thermal Company in the old Salon of the Company, above the baths of the first-class establishment. The pictures exhibited are all modern, many of them of great artistic beauty, and signed by well-known artists.

This exhibition proved such a success that it has been decided to renew it annually.

Admission 1 f. On Sundays, Thursdays, and feast-days 50 c.

Banks.—Branch office of the Société Générale, Rue Cunin-Gridaine. Banque de Vichy, Colombier et Pétillat, Place de l'Hôpital.

Eden Théâtre.—Constructed in 1882. In front of the military hospital in the Rue Lucas.

It is somewhat of the music-hall class. Refreshments are served in the garden, or in the café.

The theatre is elliptical in form and prettily decorated, and can seat 800 persons. The entertainment is fairly good.

Cercle Internationale.—This club is situated at the corner of the Rue Sornin. It has a handsome ball-room and gives a ball about once a week.

Races.—The races take place about the 4th or 5th of August. They last for three days. The race-course is quite close to Vichy. Prices for the Grand Stand 20 f. The other *tribunes* are 10 f. and 5 f. Admission to the ground, 1 f.

The value of the prizes ranges from 10,000 f. to 1000 f., and the conditions upon which horses are entered for the races are the same as those existing on most French racecourses.

CHAPTER III.

A. THE THERMAL ESTABLISHMENT OF VICHY.

First-class Baths.

DR. LUCAS was the founder of the first class bath establishment in 1820. The establishment now consists of two principal buildings and the Rosalie or Hôpital Baths.

The principal building, in the form of a parallelogram, is 57 metres long by 76 metres wide. It is devoid of all architectural ornament. Through the centre runs a gallery; the gentlemen's baths are in the west gallery and the ladies' baths in the east gallery. All the baths in this building are first class.

These baths are supplied by mineral or soft waters as the bather may desire. The mineral springs which supply them are: La Grande Grille, which gives a debit of 98,000 litres per 24 hours, and has a temperature of 42° C.; Source Mesdames, 15° C.; Puits Chomel, debit 200,000 litres, temperature 44° C.; and Puits Carré, debit 252,000 litres, temperature 45° C. This last is the warmest mineral spring that Vichy

possesses. We content ourselves with the nomenclature of these springs, having already described them in another chapter, and will only add that a buvette is attached to each one, the source of the Grand Grille being at one extremity of the northern gallery and Mesdames at the other. The buvette of the Puits Chomel is between that of La Grand Grille and Mesdames.

The first-class establishment comprises 100 baths. The bath-rooms are luxuriously fitted up, and offer every comfort; there are three taps in connection with each bath, according as one may require a mineral or ordinary bath. Both on the ladies' side and the gentlemen's side there is what may be termed a "bain de luxe." That on the gentlemen's side consists of one or two rooms, dressing-room, lounge, &c., and was built originally for Napoleon III. It has a separate entrance, and surpasses everything for elegance and comfort that can be imagined for a bath-room. On the ladies' side it is somewhat less sumptuous, and was built after Napoleon III's bath-room, so that the ladies desirous of a "bain de luxe" might not be worse off than the gentlemen. The tariff of the baths will be found further on, but for these two exceptional baths the price is 5 f. each.

Both on the ladies' and gentlemen's side are two douching rooms, fitted up with every modern apparatus, lance jet, shower bath, &c.

There are annexed to these baths side rooms for certain special treatments, *i. e.* washing of the stomach,

douches for the ears, nose, &c. Each *séance* costs one franc.

No piscines exist on the gentlemen's side, which is a great want ; on the ladies' side there are two.

At the southern end of the gallery there is a room fitted up for the inhaling of carbonic acid gas, and at the extremity of the northern gallery a like room for the inhalation of oxygen.

The second and third-class baths are situated in close proximity to the first-class baths. The entrance is by the Place des Thermes through a small garden.

These baths are in every respect identical with the first-class as far as the mineral waters, douches, &c., are concerned, but they differ in that the fittings are less elegant, and in the third-class the bath linen is reduced to a minimum.

Second and Third-class Baths.

There are 180 second-class baths, and 24 third-class. They are distributed in the same manner as those in the first-class establishment ; the ladies' baths are on one side and the gentlemen's baths on the other side of the gallery.

One feature which we have noted with pleasure is the thorough cleanliness in every part of the establishment. In this respect, at any rate, the third class are as well off as the first.

Bains de l'Hôpital.

The Company has another building in the Place Rosalie ; its popular name is Bains de l'Hôpital. It is, perhaps, the most frequented of all the baths, and is certainly the most coquettishly got up, for although the appliances and all the etceteras in each room are the same as those found in the first-class establishment, the fact of their having been fitted up and freshly decorated in 1875 gives them a much smarter appearance.

There are thirty-four baths here, and a very fine piscine, the *only one* reserved for the ladies.

The number of baths given daily is about 3500 during the season.

In every one of these establishments is a small room for the "douche ascendante," of which we have already had occasion to speak.

Charges for the different Baths.

The bather has to apply to the office at the entrance of the central gallery for his ticket, and to get his name inscribed. He will then be put in a series according as to what vacancies may be left open, and it is important that the bather present himself at the stipulated hour or he runs the risk of losing his turn,

and might possibly have to defer his bath until the next day.

Each person is allowed one hour and a quarter for the bath, dressing and undressing being included in this time; should he exceed this time he is charged for a second bath.

During the height of the season the series are as follows :

1st series	4.45 a.m.
2nd , , . .	6.15 a.m.
3rd , , . .	7.30 a.m.
4th , , . .	8.45 a.m.
5th , , . .	10.0 a.m.
6th , , . .	11.15 a.m.
7th , , . .	1.15 p.m.
8th , , . .	2.30 p.m.
9th , , . .	3.45 p.m.

These series are subject to certain modifications according to the requirements of the service, and one or other of the series can be suppressed if the needs of the service render them unnecessary. The most favourite series are those comprised between the hours of 6.15 a.m. and 12 o'clock.

The season commences on May 15th and finishes on September 30th, but the bathing establishment remains open the whole of the year.

The prices are as follows :

	1st class.	2nd class.	3rd class.
Reserved bath or douche (luxe)	. 5 f.		
Mineral bath, or piscine .	. 2·50	1 f. 50 c.	60 c.
Mineral bath and douche .	. 3·75	2·75	—
Fresh-water bath . .	. 1·50	1	—
Hip bath . . .	. 1	.75	—
Foot bath . . .	. 50	.30	—
Vapour bath or douche .	. 3	—	—
Carbonic acid bath or douche .	. 1	—	—
General percussion douche .	. 2	1·50	60
Limited or cold douches .	. 1	1	60
Ascending douche . .		.50	30
Vaginal douches . . .		0	—

There is but one price for :

Inhalation of carbonic acid gas .	50 c.
„ „ oxygen . . .	1 f.
„ „ mineral waters . .	1 f.

For extra linen the charges are as follows :

Towel	10 c.
Dressing gown	15 c.
Sheet for covering the bottom of the bath	20 c.

Baths can be had at the house between the hours of 5 a.m. and 6 p.m. The charges are :

For mineral baths 3 f. For fresh-water baths 2 f.

Between the hours of 6 p.m. and 5 a.m. there is an additional charge made of 2 f. per bath.

Should any bather wish to add chemicals to his bath a charge of 1 f. is made as compensation for the damage done to the bath.

Shower baths are given during the whole working time of the day. No series are required for these baths.

Baths and Douches at Reduced Prices.

	1st class.	2nd class.
Douche and bath taken together	3 f. 50 c.	2 f. 25 c.
Douche or bath at the series of 10 a.m., 11.15 a.m., and 1.15 p.m.	2 f.	... 1 f. 25 c.

It is usual for the bathers to give a gratuity to the attendant at the end of the treatment. The money thus collected is put into a money-box and divided among those employed at the close of the thermal season.

Gratuitous Baths.

The Company are bound to give gratuitous baths to a certain class of persons dwelling in the Departments of Allier-Loire, Haute-Loire, Puy de Dôme, &c. The Company fixes the hours for these baths, which are given between May 15th and June 15th, and August 15th and September 15th.

Manufactory of the Thermal Establishment.

To visit this establishment it is sufficient to make a request at the office (Administration, northern gallery). The Company will immediately accord the desired permission and designate one of their employés to conduct the party over the premises.

No visitor to Vichy should leave without having seen for himself how the natural salts are extracted from the waters and how they in turn are incorporated into pastilles, lozenges, barley sugar, chocolate, &c. Seeing is believing, and no one, after having gone over these premises and seen the working of the different apparatus, will be able to doubt the genuineness of the salts, &c., sold under the name of "Sels de Vichy."

We will give a short sketch of what is to be seen.

These premises are situated opposite to the bathing establishment. Upon penetrating into the building you are shown on the ground floor six large cisterns placed in two parallel lines. A steam engine works a pump which day and night pours volumes of water into them. This mineral water is obtained from the Grande Grille and Puits Carré, its normal temperature being 45° C. The cisterns communicate by means of siphons, so that the salts held in suspension by the waters may be the easier precipitated. The two superior reservoirs are the least heated, and it is here that the insoluble salts and bicarbonate of calcium are precipitated; the two following tanks have a higher

temperature and also leave deposits in the last two. By a series of successive evaporationes the mineral water is brought up to a density of 27° Baumé.

The entire evaporative process lasts eight days. In twenty-four hours twelve cubic metres of water are evaporated, and after eight days, of the 96,000 litres of water operated upon, there remains but 3600 litres.

This water is next carried by pipes into underground chambers and run into stone vats, where it crystallises. The crystallisation lasts four days. If the visitor puts his hands into one of these vats he will find crystals all along the sides and on the surface, while deeper down he will feel large blocks of many pounds weight, prismatic in form and having rough edges ; they might be compared to blocks of rough ice, only they have not the same transparent appearance and are much more brittle, being more like salt in colour. The water leaves an unpleasant soapy feeling to the hands.

The crystals are removed, placed on racks and submitted to a current of carbonic acid gas for some time. These salts, obtained by natural crystallisation, are the only ones employed in the preparation of pastilles and the artificial waters.

The water remaining after the natural crystallisation is still very rich in salts and is evaporated artificially by heat. The salts thus obtained are inferior in quality, not being absolutely pure as in the first case ; they are dried and exclusively used for baths.

The fabrication of these salts is carried on more particularly in the winter, as the salts crystallise more

freely in the cold weather, and during the season the establishment has need of most of the water for the baths.

After having visited this part of the establishment the visitor is shown the place where the springs rise from the soil, and receives certain explanations upon the "captage" question. He will be shown and have the meaning of a vast system of pipes conveying the waters to and from different parts explained. The most trying part of the whole visit is when one approaches the place where the Puits Chomel and the Puits Carré intermingle their waters, the vapour arising from these waters, whose normal temperature is 45° C., being simply suffocating, and causing large beads of perspiration to form on the face. Near to this place will be found three enormous reservoirs, seventy metres long, where the surplus of all the mineral waters are stored, to be used in the season for baths, when, by reason of the great demand, the daily supply from the springs would not suffice without this reserve quantity. There is always a certain surplus, however, not utilised, which runs straight into the river Allier by a system of canals, which at the same time carries off the water that has been employed in douches, baths, &c. The store-rooms for drying the salts, the bottling of the waters, are also to be seen here, after which the visitor regains the ground floor and enters a room where the *pastilles* are being prepared. He will see the salts being crushed, mixed with a certain proportion of sugar, rolled into a paste by the addition

of tragacanth gum, cut into the well-known lozenge forms by machinery, and stamped with the Company's mark. The mixture is in the following proportions:—33,800 gr. sugar, 1200 gr. salts, 300 gr. gum tragacanth. From 140 to 150 kilos. of these pastilles are manufactured daily, and the annual production exceeds 55,000,000 kilos.

Some people find the Vichy lozenges very insipid, and for them the manufactory has introduced certain modifications in the preparation of the pastilles, such as flavouring with peppermint, &c.

Barley sugar is prepared somewhat on the same principle. It has to be kept in a dry place, however, or it becomes of a white floury colour. Chocolate lozenges and cakes are also prepared.

The only remaining thing to be seen is the room in which the different preparations are being put up into packets for sale.

But that the visitor may have a still better idea of the vast proportion which this manufactory has obtained we should advise him to wind up his visit by going to see the

Packing and Exportation Department.—The same employé will show him this building, which is situated close to the railway station on the road to Cusset. Here the bottles of mineral waters and all the different articles manufactured by the Company are packed. The cases for packing are manufactured on the premises. Here the returned bottles are washed, &c., the three great operations performed on these pre-

mises being rinsing, putting the capsules upon the bottles and gumming a notice on each, and packing.

The exportation exceeds 5,500,000 annually.

The entire production of salts during the last five years has shown a steady increase. The Company has favoured us with its official returns for this period which we will give to the reader:

1881	.	.	10,918	kilogrammes.
1882	.	.	13,527	,
1883	.	.	15,839	,
1884	.	.	17,300	,
1885	.	.	19,112	,

Thus the quantity has been nearly doubled in these last five years.

B. THE CASINO.

The Casino, a large, rectangular building, facing the Thermal Establishment and situated at the southern extremity of the park, covers a surface of 2500 metres. It was built in 1865 by Mr. Badger, the Company's architect.

It is one of the principal buildings of the town, and forms a pleasing contrast to many like establishments by its elegance and comfort. The architecture is not confined to one style, but partakes largely of the Renaissance.

The building has a small semicircular garden in front, and is separated from the Old Park by elegant iron railings. It is composed of two pavilions, in front of which is a verandah, where concerts are given in the daytime should the weather be rainy, and evening concerts three times a week. On both sides of these pavilions are statues by Carrier-Belleuse, representing the four seasons. On the south front is another allegorical group by Carrier-Belleuse, "The Nymph of the Waters."

There are two entrances to the Casino ; the one in front of the Casino Kiosque is the handsomer of the two, and has an elegant stone staircase. The second entrance is on the other side, in front of the "Restauration."

These two entrances are united by a gallery, which divides the Casino into two parts. In this gallery is the booking office for the theatre and the Vestiare. Near to the first entrance are posted up the latest telegrams, quotations of the "Rente," &c., and also the playbills. A letter-box is placed by the side of the reading-room.

To the south of this corridor are to be found : 1, The billiard-room, (2) the theatre, and (3) the card-room.

The *Billiard-room* is twenty-seven metres long and eight broad ; in it are four billiard tables, and at all hours of the day play is going on.

The *Card-room* has the same dimensions as the billiard-room. It is reserved for gentlemen, but that

does not prevent the ladies frequenting it during the “entr’actes” of the theatre, not necessarily to take part in the gambling, but as a promenade.

The *Theatre* is of rectangular form, twenty-six metres long by eighteen broad, and of a horseshoe form at the entrance. It will hold 1200 spectators. Along the sides are stalls. All the central part is composed of one class of places; the seats are all equally good, and if those nearest to the stage be styled “dress circle,” those by the door “pit,” and the intervening “orchestra stalls,” it is simply for convenience in booking, as the prices are the same all over the house. Wherever one may be seated one is most comfortable, and by a clever arrangement in the construction one sees and hears equally well in any part of the house. Strong pillars support a gallery which goes right round the theatre to either side of the stage.

During the season there is a performance every night. On Sunday, Tuesday, and Thursday it is generally an opera; the other nights are devoted to comedy. The variety in the selection of the pieces is very great, and the same piece will rarely be performed more than half a dozen times in the same season, unless by special request. Of the quality of the performances the public are the best judges, and during the height of the season, *July and August*, the theatre cannot contain all those who apply for places. About once a week special *castes* come down from Paris.

On the north side of the gallery are to be found:—

1st, the ladies' drawing-room ; 2nd, the concert-room ; 3rd, the reading-room.

Ladies' drawing-room presents the same breadth as the billiard- and card-room, but is not nearly so long, only seventeen metres. The ladies have everything here to while away time, a splendid pianoforte, newspapers, albums, &c. The room is nice and airy, and of a very cheerful aspect.

The *Reading-room* has the same dimensions as the ladies' drawing-room. Tables covered with newspapers in every language, Spanish, French, English, German, &c. ; in a word the principal papers of every country,—the ‘Times,’ ‘Daily News,’ ‘Telegraph,’ ‘Standard,’ ‘Jockey,’ ‘Journal des Débats,’ ‘Le Temps,’ ‘Le Figaro,’ ‘La Liberté,’ ‘La France,’ ‘Le Petit Journal,’ ‘La Paix,’ &c.

Papers of every shade of politics can be read here.

The room is liberally supplied with writing materials, and many people appear to do all their correspondence there.

The *Concert-room* is a most spacious and tastefully arranged room. It is second to the theatre as far as its size is concerned. It opens both on the central gallery and the verandah. It is used for the evening concerts and for balls.

The Casino orchestra gives two public concerts daily, in the morning from 8.30 to 9.30 a.m., in the afternoon from 2.30 to 3.30 p.m., and three evenings in the week under the verandah at 8 p.m.

The Casino opens on 15th May and closes on 15th

October. The theatre opens on 15th May and closes on 30th September. Operas are only performed between the 1st of June and 15th of September.

Regulations of the Casino and Theatre.

Art. 1.—The Casino is open from the 15th of May until the 1st of October, but the billiard-room is open to the public until the 15th of October, on condition of their paying a supplementary sum of 50 c. per day or 5 f. for the fortnight.

Art. 2. The subscription to the Casino or to the theatre is for one month. To become a subscriber it is necessary to be introduced by some respectable and known person.

Art. 3. The subscription to the Casino gives the right :

1. To free admission to the card-room, billiard-room, reading-room, ball-room, verandah, and to the private garden.
2. To admission to the balls and concerts given in the ball-room.
3. To the gratuitous use of the chairs in the park, Celestins and other promenades belonging to the Company.

Art. 4. Four times a week a ball or concert is given in the concert-room of the Casino, from 8 to 10 in the evening.

Art. 5. Once a week the Company reserves to itself

the use of the ball-room and its dependencies. On this day, due notice of which should be given forty-eight hours beforehand, the subscribers are not entitled to admission. The Company will fix a special price for admission.

Art. 6. The scale of prices is as follows :

Individual subscription	25 f.
For a child under 15 years of age	10 f.
Entrance for a day, even on ball or concert days	2 f.

Art. 7. From 7 a.m., subscribers have access to the card-room, reading-room, concert-room, ladies' drawing-room and billiard-room. Under no circumstances can these rooms be closed until at least a quarter of an hour after the end of the evening performance. From the 15th September to the 1st October they will remain open until 10.30 p.m.

Art. 8. It is forbidden to smoke in the reading-room, the concert-room, or under the verandah while a concert is going on.

Art. 9. In the reading-room, the subscribers will find a sufficient number of political and literary papers.

Art. 10. The authorised games are those which are designated society games, such as piquet, écarté, impériale, douze points, whist, boston, besique, backgammon, dominoes, chess and billiards.

Art. 11. The charges are as follows.

Whist	5 f.
Piquet	3 f.

Écarté	2 f.
Billiards, in the daytime, per hour	1·50
Billiards, in the evening, per hour	2·50
Dominoes, backgammon, chess, the game	1 f.

Art. 12. The changing of cards is obligatory every hour.

Theatre.

Art. 13. The admission or subscription to the theatre is distinct from the admission or subscription to the Casino.

Art. 14. Smoking is forbidden in the theatre.

Art. 15th. The prices are as follows on ordinary days :—

Admission with numbered stall	4 f.
Box for four persons	16 f.
Individual subscription with numbered stall	45 f.
Admission to both theatre and Casino for one day	5 f.
Individual subscription to both Casino and theatre	60 f.
Family subscription, including the hus- band and his wife, or one of them with a child	100 f.

Art. 16. Special performances, that is to say, those

in which the performers do not belong to the usual troupe, must be announced a couple of days in advance. Bills and programmes will indicate the prices for these special performances.

The Company reserves to itself the right to use the theatre once a week. On these days, which must be announced forty-eight hours beforehand by bills fixing the prices, as a general rule subscribers' tickets cannot be used.

Members' Tickets.

Art. 17. Members' tickets for the Casino are personal, and signed by the holder. They must be shown whenever asked by the Company's employés, and can neither be lent, given away, nor sold.

The tickets for the theatre are also personal. The holders, however, have a right to dispose of them to respectable people, if they give notice to the Company before 5 p.m., and pay an additional 2 f. upon each place. Should the ticket-holder have left Vichy without having availed himself of this rule, the Company has a right to dispose of his place after 5 p.m.

Should an expired ticket be used, or the ticket be used by any other than the lawful owner, or except in accordance with above rule, the holder will have to pay his place at the prices fixed by Art. 6 and Art. 15, and the ticket will be taken from him, the Company

reserving to itself the right to prosecute the offending party.

Art. 18. The saloons in the Casino and the theatre should be closed at 11 p.m., or at latest, at midnight.

The tourist who is only stopping twenty-four hours at Vichy can participate in all the advantages accorded to a member (the days of special performances excepted) on a payment of 5 f.

Charges for carriage drives.

From 6 o'clock in the morning until midnight, a one horse carriage, the course 1f. 25c., the hour 2f. 25c. A two, horse carriage, the course 2f., the hour 3f.

From midnight until 6 o'clock a.m., a one horse carriage 2f. the course, 3f. the hour. A two horse carriage 2f. 60c. the course, 3f. 50c. the hour.

To or from the station, with or without luggage, to an hotel, or from the hotel to the station, from 6 a.m. until midnight, 1f. 50c. for a one horse carriage, and 2f. 50c. for a two horse carriage.

For this fare travellers are conveyed from the station until they can obtain a lodging.

Cusset.

One horse carriage, the course 1f. 60c., the hour 2f. 50c. Two horse carriage, the course 2f. 50c., the hour 3f. 50c.

The course for Vichy and Cusset is the distance comprised between the starting point and the end of the journey, and the return journey is not included in these prices.

Carriage drives outside of Vichy without any definite point in view are charged 3f. for the first hour and 2f. for the following hours, for a one horse carriage; the half day 9f., the whole day 18f. For a two horse carriage, 4f. the first hour, and 3f. afterwards; the half day 12f. 50c., the whole day 25f. The day is fixed at twelve hours, during which time two hours must be allowed for resting the horses.

Drives beyond Vichy.

		1 horse.	2 horses.
Charmeil . . . . .	.	7 f.	10 f.
Côte St. Amand . . . . .	.	7 f.	10 f.
Côte St. Amand (return by Cusset)	.	8 f.	12 f.
Hauterive . . . . .	.	7 f.	10 f.
Les Malavaux . . . . .	.	7 f.	10 f.
La Montagne-Verte . . . . .	.	7 f.	10 f.
St. Rémy . . . . .	.	7 f.	10 f.
L'Ardoisière . . . . .	.	8 f.	12 f.
Cognat—Bois-de-l'Eau . . . . .	.	12 f	.15 f.
Busset (return by route Nationale			
No. 106) . . . . .	.	15 f.	20 f.
Busset (return by L'Ardoisière) . .	.	16 f.	22 f.
Châteldon . . . . .	.	15 f.	20 f.
Maulmont (return by route Nationale			
No. 106) . . . . .	.	15 f.	20 f.

		1 horse.	2 horses.
Gannat . . . . .	.	15 f.	20 f.
Randan (By Bois Randenez)	.	15 f.	20 f.
Randan (return by Maulmont)	.	18 f.	24 f.
St. Germain-des-Fossés	.	7 f.	10 f.
Billy . . . . .	.	12 f.	16 f.
Effiat . . . . .	.	18 f.	24 f.
Ruins of Mont Gilbert	.	30 f.	40 f.
Grotto of St. Martin	.	30 f.	40 f.
St. Yorre . . . . .	.	8 f.	12 f.

The return journey is comprised in these prices.

CHAPTER IV.

PROMENADES IN THE ENVIRONS OF VICHY.

Montagne Verte.

THE MONTAGNE VERTE is one of the most frequented promenades in the environs of Vichy, and is well worthy of a visit. It is situated within about three kilometres of the town, and although the greater part of the way it is up hill, the ascent is gradual and easy. You quit the town by the Rue de Ballore ; after a few minutes' walk you pass on your left a hydropathic establishment, and then cross the River Sichon by a stone bridge, which is absolutely devoid of artistic merit. From this point until you come within a few hundred yards of the Montagne Verte, the road offers but little protection from the sun. You pass through Pinasson, turn down a sheltered road, and reach in a few minutes a similar hamlet, the Chaume Guinard ; another small road, and you are at the Montagne Verte.

Here you find an establishment, a kind of restaurant, admittance to which is 1 franc. You enter a garden in which are a variety of games, with plenty of bosquets

and benches. At the end of the garden is the restaurant, where one can breakfast or dine according to the time of the day one makes the excursion. To the right of the restaurant is a tower from which, with the aid of a telescope, one obtains a magnificent view of the surrounding country. The names of the different places thus seen we will give by copying the notice at the entrance to the garden :

“Le grand panorama de la Montagne Verte se compose de la chaîne de Forez du Mont Dore, des Montagnes neigeuses du Puy de Dôme des Géants d’Auvergne, des Monts de la Creuse, de St. Léon, et de St. Martin Destréaux. Du Belvédère, par le moyen d’un telescope d’une force extraordinaire, la vue embrasse de plus de 40 lieues et permet de voir une foule de détails tels que les Châteaux de Randan, Bourbon, Busset, Nades, Veauce, la Fauconnière, Moulins et la Cathédrale de Bourges, &c.”

THE VESSE INTERMITTENT SPRING.

This spring is only a few hundred yards beyond the Vichy Bridge, on the left-hand side of the road. You have but to cross the bridge and follow the road in front of you until you come to a small building on the left-hand side, which has written upon it “Source Intermittente de Vesse.” The admittance is 50 c. when the spring is bursting forth, and 25 c. when it is not in action.

This is one of the most curious phenomena to be seen near Vichy, and amply repays a visit. Before the year 1870 the intermittence was regular, and took place about once every hour, but in 1870 the pipe which gave exit to the water burst, and was replaced by a fresh pipe having a larger diameter (ten centimetres). Since that time the eruption has been irregular, and takes place about once every six hours. The hours at which the spring can be seen spurting out are posted up daily at the Thermal Establishment, the person in charge of the spring calculating after each eruption when the next is likely to take place, his data being the atmospheric pressure, the temperature, and other meteorological conditions.

The spring is situated in a small garden, and rises in the centre of a stone basin, around which are placed a number of benches for the use of visitors. Previously the water was allowed to fall upon the ground, which made the place resemble a swamp, but now that the water falls into a basin and that trees are planted all around the rise and fall of the spring can be watched without any discomfort.

When the hour for the outflow approaches, the man in charge follows the movement of a float which is let down into the pipe, and which rises as the water in the tube rises. When the float is near to the top of the tube he withdraws it. In a few minutes the water is seen to dribble over the side of the pipe, and at the same time a considerable quantity of gas is disengaged; this stage lasts some ten minutes, then

a spurt upwards takes place, followed by other spurts, each acquiring a higher elevation, until the jet attains some five or six yards in height. It is now steaming and of a snowy white appearance, in consequence of the large quantity of gas it contains, and emits a strong sulphurous smell. It is somewhat restrained and prevented from wetting the people around by a kind of iron cupola fixed over the top of the basin. After about five minutes it has attained its maximum height and rapidly falls ; in another twenty minutes it has descended once more into the pipe, and not a single drop flows outside. This intermittent spring has been compared to the geysers of Iceland, and it certainly does present a certain similarity.

This water has no medicinal use, and is only drunk, or rather tasted, by the visitors out of curiosity. It has a very strong sulphurous taste and smell, and few people care to do more than merely sip it. It is estimated that at each eruption it gives out some 6000 or 7000 litres of water. The temperature is somewhere about 30° C. The analysis offers but little interest, as this spring is in no way utilised, and if we give it it is simply to compare it with the other Vichy springs.

Proportions of the various principles contained in one litre.

Carbonic acid	.	.	.	.	4·831
Sulphuric acid	.	.	.	.	0·137
Phosphoric acid	.	.	.	.	0·025
Arsenic acid	.	.	.	.	0·001

Boric acid	traces.
Chlorhydric acid	0·318
Silice	0·041
Protoxide of iron	0·022
,, of manganese	traces.
Lime	0·265
Strontia	0·003
Magnesia	0·122
Potash	0·115
Soda	1·912
Bituminous matters	traces.
Total	7·335

CUSSET.

Cusset is three kilometres from Vichy. The road by which you quit the town is to the left of the railway station as you stand at the end of the Rue de Paris, facing the station. A level crossing over the railway being passed, you have the exportation department of the Vichy Water Company to your left, and a few yards further on you pass the Wallon Printing Establishment on your right.

You continue straight on, and are almost immediately in the "Allée des Mesdames," so named in memory of Mesdames Adélaïde and Victoire of France, who planted the trees which line it in 1785, a nicely sheltered avenue which will lead you direct to Cusset. The River Sichon is to your left, but it is not here that it is seen at its best. About midway between Vichy and Cusset you pass the gasworks.

To enter Cusset you have to cross a bridge over the Sichon.

You have then the thermal and hydropathic establishment of Ste. Marie on your left. As this establishment is much frequented we will give a few details concerning it.

This establishment is supplied by two springs: (1) Ste. Marie and Elisabeth, two of the richest and coldest mineral springs that the environs of Vichy possess. We give their analysis in another part of this volume. There are thirty baths for ladies and gentlemen, and a very complete douching establishment with all the latest improvements in the way of apparatus. A "piscine," with running water, six metres by five, is agreeably arranged and much frequented.

The establishment is surrounded by a garden, in which are seen the two buvettes attached to the springs, and also a small kiosque for the sale of the pastilles, &c., which are manufactured from the salts contained in these waters.

After having visited this establishment you continue in a straight line, passing by the Place de l'Hôtel de Ville. You will then perceive another spring, the Source Tracy, and should you wish to drink at it will have to descend some fifteen steps.

There are two other springs, the Source St. Jean, by the slaughter-house, and a source as yet unnamed in the Cours Lafayette, but these are hardly worth visiting.

A ramble over the town offers a certain amount

of interest, on account of its old and picturesque houses.

Cusset is much frequented during the Vichy season, when it forms almost an annexe of the town, as many people lodge there who have been unable to find the accommodation they expected in Vichy. Its normal population, out of the season, is about 6500.

There are great facilities of communication between the two towns, numerous cars running every few minutes. They start from the Place des Quatre Chemins, fare 20 c. A tramway leaves the thermal establishment in front of the Grande Grille every thirty-five minutes. It commences running at 4.30 a.m. and ceases at 7.40 p.m. Bathers for the Ste. Marie Establishment can use it free of charge to the bathing establishment. A special tram runs in connection with the theatre and Casino, ten minutes after the performance is over. The fare for this special service is 50 c. per passenger.

From Cusset it is an easy walk to Malavaux, which we shall now describe. The Puy de la Garde, Châteaux de Vernet and of Viermeux, Chassignolles village, and the Château of Champagnat, are in the vicinity and worth a visit.

MALAVAUX.

Malavaux is three kilometres from Cusset and consequently seven kilometres from Vichy. One can take the tram to Cusset or continue the promenade after having visited Cusset.

From the Place de l'Hôtel de Ville, near the Tracy Spring, you reach the Place de la République, which is a continuation of the preceding Place. Arrived at the end of the Place de la République you turn to the left and take the Rue du Faubourg St. Antoine. After having walked for about one kilometre you come to a small river, which runs at right angles to the road, and over which a bridge is thrown. This is the River Jolan. You turn abruptly to the right without crossing the bridge ; a signpost tells you that you are two kilometres from Malavaux. You follow the banks of the Jolan, which flows on your left, for about another kilometre, when the river crosses the road, and you have to pass over a wooden bridge which brings the river on your right hand. After about another ten minutes' walk the river crosses the road again, and you have to pass over a second wooden bridge, the river being thus placed once more to your left. In five minutes more you are at Malavaux.

The derivation of Malavaux is from the Latin words "maladicta vallis," *i. e.* cursed valley. The term is hardly appropriate, however, for that part of the walk comprised between the first bridge and Malavaux presents many very pretty green spots. The way along the Jolan is through a narrow valley ; on the right hand side and for about the first mile the bank is green and fresh, and the whole way along are to be seen ferns and many wild flowers, such as digitalis and forget-me-nots, in abundance. It is only after about twenty minutes' walk that the country on your left

becomes really rugged and wild looking, but even then the scenery has something fascinating about it from its very wildness. The river, which as you first turned to the left had but the appearance of a brook, grows wider and the stream more rapid as you proceed ; you will notice many miniature waterfalls, the bed of the river becomes more and more rocky, and finally, by the time you arrive at Malavaux, you have something very much like a good Scotch burn before you.

The Malavaux is the name given to the Café Restaurant, and it is to the proprietor of the restaurant that one has to apply for permission to visit the different objects of interest in the vicinity. This permission is graciously accorded upon the production of one franc, or, as a notice informs one, is gratuitous if you take a breakfast or dinner there. The price for the first is 3 f. 50 c. and of the second 4 f. 50 c. Wine is not included in these prices. The meal generally consists of trout, crayfish, chicken, or steak, and a dessert. They are well prepared, but quite sufficiently paid for. If one intends to take a meal, it is as well to see what is to be seen while it is being prepared.

You will see on a signboard, "Ruines du Château de Montélar de l'ordre des Templiers, le plateau de la Couronne avec son musée archéologique. 1 f. d'entrée. Gratuité si on prend un repas."

A guide takes you by a most steep and trying mount (for asthmatic people), to the remains of the convent, which is reached after a ten minutes' climb. He shows you some of the remains of the foundation

of the building where the chapel stood, points out what in olden times served as tombs for the Templars, who, in parentheses let it be said, acquired for themselves great reputation by reason of their pillaging forays ; and he will tell you that quite recently some more old femurs, tibias, and perhaps a tooth or two have been found. This information having been given, and a few minutes accorded to you to digest it properly, he will suddenly call your attention to the wonderful view to be obtained from the Plateau de la Couronne, and will point out to you, in the distance, the Montagne Verte, Bois de Randan, Montagne d'Auvergne, Montagne du Forez, &c. The next sight is the Musée Archéologique. Here are a few remains (said to belong to these Good Templars), such as some of the long bones and ribs, but what the guide shows with greatest gusto is “an entire skeleton,” and he begs you to remark that all the teeth are complete. An old marmite (iron kettle) is also to be seen, and it is a fact to be noted that these kettles are never absent from collections of this kind.

You are next shown the “The Devil’s Well” (Puits du Diable), said to have been dug by the Templars in the search for the treasure they never found. From this same point he calls your attention to what is styled “The Monk on his Knees.” It is two rocks some little distance off, one placed above the other, which, with a stretch of the imagination, you fancy to be a monk in that devout posture. A few steps further and more remains of the convent are shown

you. Another slight elevation and you come to the "Source des Sarrazins" ou de la Vierge (Spring of the Virgin), which it is satisfactory to know has never run dry, even during the greatest dearths. The guide then makes you listen to the echo, tells you that there is nothing more to be seen, and gives you to understand that he is quite ready to accept any gratuity you may feel inclined to offer him.

L'ARDOISIÈRE (SLATE QUARRY).

L'Ardoisière is about twelve kilometres from Vichy. To get here one has to pass through Cusset and then make for the banks of the Sichon. It is nine kilometres from Malavaux, and for a good walker who has the whole day before him, Cusset, Malavaux, and L'Ardoisière can all be easily managed. We have done the three places with ease, leaving Vichy at 11 o'clock and regaining the town at 7 p.m., but as the distance in all is about thirty-two kilometres, we would advise pedestrians to make an early start, say at 7 a.m., particularly on a warm day. They will enjoy the scenery much more by walking than by driving. We shall indicate in the first place the way from Malavaux and then describe the road back to Vichy from L'Ardoisière along the banks of the Sichon. This latter road is the usual one taken, and the tourist will easily follow the way to L'Ardoisière if we give him the way back. It is hardly practical to reverse the order and take Cusset, L'Ardoisière and then Malavaux, for to gain the Malavaux road from L'Ardoisière there

is a fatiguing ascent of one and a half kilometres to be made, which in the reverse direction, being a descent, is very easily accomplished.

From Malavaux you continue straight on the road which brought you to it. It is very serpentine, but of a gradual and easy ascent, with occasional descents, for about five kilometres. You pass one or two isolated farmyards during this walk, and the country offers no very wonderful scenery. You next come to a wood through which the road passes for about half a kilometre; about one kilometre farther and you perceive a signpost on your right hand indicating that L'Ardoisière is at two kilometres distance. You must look out for this signpost as it is easily passed by, not being *on* but slightly *off* the road. You turn down to your right and enter immediately into a lovely valley; a rapid descent of one and half kilometres brings you down to the banks of the Sichon, where you join the road from Cusset to L'Ardoisière, this latter place being about one kilometre farther on. As you have to retrace this part of the road on your return journey we will describe it later, simply saying that the road is now direct; after reaching the banks of the Sichon you turn to your left and in ten minutes are at L'Ardoisière.

The entrance fee is 50 c., or if one takes a meal here it is gratis (lunch 4 f. 50 c., dinner 6 f.).

The name signifies *slate quarry*, and this is the first thing to visit. A guide will take you round from one place to the other.

The entrance to the quarry has the appearance of a dark cave, and it is necessary to employ a lantern for this part of the excursion. One is struck by the chilliness as soon as one enters this dark hole, and it would be well for the tourist to cool down a bit if he has made the excursion on foot before visiting the quarry. One goes through a large gallery, which leads to a deep well, formerly constructed for the extraction of slate, but which, having been abandoned after many attempts to work it profitably owing to its friability, has since become filled with water. It oozes from the sides of the quarry, and the visitor hears it constantly dripping into the well, sixty metres deep. The depth can be calculated by letting a stone fall in the well. Ten seconds elapse before the splash is heard.

The guide will next conduct the visitor to the Gourre-Saillant, by a shaded path on the left of the entrance.

The Gourre-Saillant is a magnificent waterfall, in the bed of the Sichon. In dry weather there is little to be seen, but after a few days' rain the Sichon resembles a mountain torrent, and the water having a considerable fall here is covered with white foam, and as it goes dashing along against the rocks its roar can be heard for some miles.

This part of the programme over, it remains for the visitor to decide whether he will make the

Mont Peyroux excursion. To do so it is necessary to climb the mountain, which being accomplished, some

remains of what is said to be a castle having belonged to the Knights Templars will be shown. We may remark here that every ruin is said to belong to this respectable body, and we should not always advise the visitor to go out of his way to visit them. In this particular case we certainly do not consider that the game is worth the candle, the only satisfaction to be obtained after this laborious climb being the charming view from the summit.

L'Ardoisière is renowned for its trout and crayfish. The Sichon is stocked with both, and you can be persuaded of the freshness of the fish by seeing swimming about the very fish upon which in a few minutes you are going to regale yourselves. This is a delightful place to dine at, and the walk back in the cool of the evening is most enjoyable.

The way back is along the banks of the Sichon. Upon leaving L'Ardoisière you cross a bridge over the Sichon and then turn to your right, whence the whole way to Cusset is straight and cannot be mistaken.

On this backward journey one will remark that the valley through which one is passing gets narrower on approaching Cusset, and the scenery less effective. For the first kilometre on the homeward journey the valley is all that could be desired for loveliness ; ferns (amongst others the *Adiantum nigrum*) being found in great variety. On the left bank particularly they abound, while on your right rolls the Sichon, more or less striking according to the dryness or wetness of the season.

After a walk of a kilometre you pass on your right hand the bridge over which you crossed to gain this road on your way from Malavaux. You do not cross it now, but continue straight on and soon reach the village of Grivats, four kilometres from L'Ardoisière and three from Cusset. Grivats used to be renowned for its linen manufactories, which were called “Toiles de Vichy,” and was at one time a most thriving and industrious little village. The manufactory belonged to the Counts of Bourbon-Busset, and employed some 300 workpeople. It was burnt down in 1867, and has never since been rebuilt; its blackened walls, however, are yet to be seen.

Between this and Vichy one passes on the left a rock called the “Saut de la Chèvre” (the goat’s leap), but which does not now attract much attention. A little later one gets into the suburbs of Cusset; continuing on the same road, you fall into the Cours de la Fayette of Cusset. You now turn to the right, then first to the left (Place de la République), where you will see the stand for the Vichy cars, or you can return by the itinerary already described under the section Cusset.

CÔTE ST. AMAND.

This is an excursion that may be made on foot, as the mountain is but about five kilometres from Vichy, but as there is a good bit of climbing, more

particularly as you approach the summit, it will be better for those who are not fond of climbing to avail themselves of the back of a donkey or take a carriage.

One follows the Nîmes road, passing through the Place du Château d'Eau, and a little farther on by the Celestins and Lardy Parks. Still continuing the same road you come to the railway line going from Vichy to Tiers, which you cross by a level crossing and turn immediately to your left, where a signpost stands, with "Restaurant de la Côte St. Amand" written up. After a walk of some thirty yards you turn to the right and follow a lane until the road branches to the right and left. You follow the right branch, and after some three hundred yards' walk find yourself upon the road to Abrest, which is only one and a half kilometres distant. You continue to the right, and in about five minutes come to another and much smaller road to your left, which you take. Here is also a signpost.

If you have taken the precaution to provide yourself with a field glass, it can be used with advantage at this point, as you have a fine view of the winding river. Before coming thus far you will have passed the reservoir which supplies the town of Vichy.

From here, until you arrive at the summit of the mountain, where the restaurant is pitched, the ascent is more rapid, and particularly so when you reach a turning on your right, which you take, and where a large board informs you that the entry to the restaurant, and tram from this point included, costs one franc.

Do not count too much on the tram, or you may find yourself disappointed ; frequently it is not running. After a very laborious climb you reach the restaurant, mount a tower, and by means of a telescope obtain a very fine view. The valley of the Allier, the windings of the river, the Forez Mountains, Busset Castle, Mountains of Thiers, the woods of Auvergne, Randan Castle, and Maulmont can all be easily seen, as well as the town of Vichy in all its details.

The altitude is 433 metres and therefore superior to that of the Montagne Verte. The road is through vineyards and fields, and makes a most agreeable promenade.

The Côte St. Amand is situated between two small villages ; Vernet, at the foot of the hill towards Cusset, and Abrest on the other side of the hill on the banks of the Allier.

Instead of returning by the same road, one can visit these two villages and return by Cusset, or visit Vernet, then Abrest, and push on to Hauterive.

Vernet.—After leaving the restaurant turn to your right, and after walking some twenty-five yards to your left you will see Vernet in front of you, and in about ten minutes will reach this village. There is nothing of much interest to notice here ; the houses are generally of a very poor class, the streets ill-paved and not very clean.

Abrest.—After having passed through the village of Vernet take the second turning to your right through the vines, and in half an hour you gain a high road.

A little to your left you see a metal plate indicating that Abrest is three kilometres from Vichy. You turn to your right where you see this announcement and traverse the village.

It is somewhat larger than Vernet, cleaner, and has a larger population.

The church is worth looking into, and if you continue to your right after leaving the church you come to the Château of Abrest. This is not open to the public, but the exterior merits inspection. To get back to Vichy retrace your steps to the high road which leads you straight to the town.

Hauterive is not far off, about three kilometres. We will describe how to reach it from here, and how to get there, starting from Vichy, under the heading Hauterive.

HAUTERIVE.

At about five kilometres from Vichy, an easy walk. If one wishes, donkeys can be hired for this promenade. Population 600.

Cross the bridge of the Allier, take the first turning to the left, and for four kilometres keep on the same road ; you will then arrive at the village of Hauterive, the spring being a good kilometre further on. Visit the church here. Turning to your left, you follow the road for some ten minutes, when you will pass a striking mansion, the château of the Besse family.

The Hauterive Spring is about five to ten minutes

further on. You enter a large park of many acres extent, follow the central alley, and arrive in front of a house. On one side of it you will see the word "Rafraîchissements." You enter, and can taste the water of the spring, which is conducted by pipes to this building, where the bottling is carried on. The water is principally used for exportation, and for the services of the buvette. There is no bathing establishment.

In the park, near to the house, is to be seen the spring whence the water is obtained by boring.

Should you desire to make the excursion from Abrest, descend, after passing Abrest Castle, to the river, take the ferry boat across and then follow the banks on the left until you get to the village of Haute-rive about one and a half kilometres distant, when the road is the same as that indicated above.

The ferry boat is attached by a pulley to an iron cable thrown across the river, and the current is sufficient to carry the boat across without the use of oars.

LE-PUY-GRENIER.

An easy and pleasant walk from Vichy, being but eight kilometres distant.

Leaving Vichy about 7 a.m., one can easily return by 12 o'clock, although many people prefer to start later and breakfast at the restaurant of this place.

Make for the bridge, cross it, and follow the road

to Gannat. A few minutes after crossing the bridge you pass the Vesse Spring on your right. From this point until you arrive at a signpost, distant two kilometres from Vichy, the road is quite straight, even, and along a broad and well-sheltered avenue. When you get to the signpost, turn sharp to the left and you are on the Gannat road. Note, the signpost is so placed that it misleads rather than indicates this road.

Here the ascent is pretty steep and continues so far about a couple of kilometres. On the left, at a distance of but about a quarter of a mile, will soon be seen a part of the Bois-de-l'Eau. At four kilometres from Vichy, one reaches the borders of the Bois de Charmeil, and after a few minutes' walk the road takes a sharp turn to the left. The road then passes through the wood. After another ten minutes' walk you come to a couple of mean houses on your left. Opposite to them, on your right, is a small road, leading through the wood, at the entrance to which is a signpost indicating that it is the road for Vozelle and Espinasse. You turn down here, and will find it one of the most pleasant parts of the wood. You will follow this road without turning to the right or left until you have passed Vozelle, a small hamlet composed of some dozen houses, which you reach in about a quarter of an hour. After having passed the houses the road bifurcates where you turn to the left. About a hundred yards further on there is a second bifurcation, and this time you turn to the right; in five

minutes a third bifurcation, when you turn to the left.

You are now quite near your journey's end ; the road is downhill and winding and in ten minutes more you come to an iron cross on your right hand. In front of it is a turning to the left. Avoid this turning, and keep to the right. The Puy-Grenier is at twenty yards distant.

The Puy-Grenier is a raised plane, well wooded, converted into a garden and restaurant. Thence a very good view can be obtained of the surrounding country, but the walk to the place, and in the shaded alleys of the garden, is more of an attraction than the prospect, which is certainly inferior to those to be had from many other points, notably, La Montagne Verte, L'Ardoisière, and Côte Saint Amand.

MAULMONT.

Although Randan and Maulmont are distant from each other about eight and a half kilometres, it is usual to include both in the same promenade, as it gives one the opportunity of returning by a different road from that taken on the outward journey, and which would otherwise have to be repeated on the way home.

The excursion to and from these places requires nearly a day, or at any rate a start not later than 11 o'clock in the morning, to be done comfortably.

The distance for the return journey is thirty-four kilometres. A good walker can do it on foot. An omnibus

starts from the Place de la Marine every Thursday and Sunday during the season at 11.15 a.m., returning at 4.30 p.m. Return fare 3 f. 50 c. Places can be secured beforehand at the tobacconist's in the Place de la Marine.

As the Château de Maulmont is only open on the Thursdays and Sundays it is necessary to choose one or other of these days for the excursion.*

The Maulmont Castle is open from 10 a.m. to 3 p.m. to visitors, and the park from 1 to 4 p.m., both on Thursdays, Sundays, feast-days, and fair-days, from May 9th to October 17th. It is usual to visit in the first place Maulmont on account of the early hour at which access to the castle is obtained, and to return to Randan.

The first part of the road is the same as that for Hauterive, which has already been described elsewhere. Leaving the town by the Rue du Pont, you cross the bridge, take the first turning to the left, avoiding the road by the river side. A post indicates the road for Hauterive.

You follow this road through fields for four kilometres, when you arrive at Hauterive. The church is to your left, which visit if you have not done so already. The road for Maulmont is at your right, and you will see here a signpost indicating that St. Priest is at 6·5 kilometres. Follow this road.

For the first mile or so, houses are scattered about on both sides of the wood ; after some fifteen minutes'

* Lately admission is refused to the public.

walk you pass a small pond on your right, and about a couple of hundred yards further on, same side, a stone cross. A small rivulet crosses the road presently, and from this point for about the next kilometre the road becomes more circuitous, and is uphill.

At about four kilometres from Hauteville you come to the first village, Les Caires, and immediately after passing through this village you perceive on your left a prominent building about fifty yards off the road, presenting a number of towers. This is La Poivrière. At about a quarter of a mile distant are the small streams of Germinal and L'Andouette, which you cross; you are then at the village of St. Priest. A quarter of a mile more and you come to a bifurcation; turn to the right. The signpost on your left indicates that you are now 8·2 kilometres from Randan.

Almost immediately upon turning to your left you perceive, on a height, the Château de Maulmont. If you have a carriage you should get down here, and entering a wide road, with a barrier in front, proceed on foot to the castle, a walk of some ten minutes. The carriage will rejoin you higher up when you have finished your visit.

The Maulmont Château, belonging to the Duke of Montpensier, was built by the Princess Adelaide, sister to Louis Philippe, for her nephews, as a meeting place for hunting. It is built in the Gothic style; its battlements and turrets are most picturesque, and the grounds about them very beautiful. The château, from the elevation upon which it stands,

commands an extensive view of the surrounding country.

The visitor is shown in the first place the reception room, tastefully but simply decorated. The panels are in Dutch oak and the chairs covered with embossed leather.

The dressing-room of H.R.H. the Duke of Montpensier is next entered, and is very similar, both in decorations and in furniture, to the preceding.

Thence one passes to the Court of Honour of the "rendezvous de la chasse," the stables and kitchens being on the left. The latter with their various offices are most spacious. You will be shown here a crémaillière of the twelfth century, and a spit dating from 1625. The enormous fireplace is large enough to roast an ox entire. Further along, on the same side of the court, you pass the well and then reach the terrace, from which a good view is to be obtained. (Before passing on to the terrace you will remark that the old loopholes in the walls for musketry still exist.)

The dining-room is next entered, through a door surmounted by an inscription, and on either side two pieces of sculpture. In the interior will be seen a handsome oak chest of the fourteenth century, being the Corbeille de Mariage of her Royal Highness, and two other pieces of furniture in oak, the one with the four seasons carved upon it being of the fourteenth century, the other, with a carving of the four Evangelists, of the sixteenth century. The stained windows are modern, only dating back from 1841.

Under the table will be noticed the skin of a lion killed by the Duke of Montpensier in Algeria in 1841, a silver suspension lamp and massive silver ink bottles, candlesticks, &c.; a glass for beer dating from 1577. The study of his Royal Highness communicates with this room.

The vestibule is next crossed, and then you mount the turret, an ascent of sixty steps, from the top of which you will see Bourbon-Busset Castle, St. Amand, and the Montagne Verte.

The castle having been seen, one of three things can be done. 1st, take a walk in the grounds; 2nd, proceed to Randan; 3rd, return to Vichy, passing by the Pont de Ris.

The Pont de Ris is three kilometres distant from Maulmont. You pass through the small hamlet of Guérinets, and continue on the right by a road bordered with poplar trees. The Pont de Ris was built at the same time as Maulmont by M. Ad. Boulland, and is quite in architectural keeping with it. A small toll has to be paid to cross this bridge.

RANDAN.

Randan is usually visited after Maulmont, and forms, so to speak, part of the same excursion.

To proceed to Randan you descend the alley in front of the "rendezvous de la chasse" until you get upon the high road. You then turn to the left. A sign-

post at this point indicates that it is eight kilometres to Randan. The road lies the whole way through woods until you get within a kilometre of Randan, when it becomes more open and is flanked by houses. The different woods you pass through are the Bois de Charve-Chave, Planisse, and Pouble. When you enter the town you keep somewhat to the left, and in a few minutes are in front of the gates of the Randan park. The town itself offers nothing of interest.

The park is large, and from the terrace an expansive view of the surrounding country can be obtained,—the Mont Dome, &c. The lake and farmhouse are worth a visit.

The castle used to be open to the public on Thursdays, Sundays, feast- and fair-days during the season from 1 to 5 p.m., but now it is difficult to obtain admission in consequence of a robbery which took place there some time ago.

The Castle of Randan, built in the Middle Ages, belongs to the Duke of Montpensier. The Princess Mercédès was betrothed here to Alphonse XII, King of Spain. Hardly a vestige, however, of the old castle remains, it having been entirely restored in 1822, in imitation of the architecture of Henry IV's time.

The principal parts to visit are :

The Servants' Waiting-room, containing a number of pictures, some of which were executed by King Louis Philippe and his brother, the Duke of Montpensier.

Salon de Madame, so named in remembrance of the

Princess Adelaide, contains portraits of the Duke and Duchess of Orleans, Louis Philippe, Queen Amélie, &c.

Grande Salon de Famille, with a billiard table, piano, &c.

Salon du Roi contains family portraits. It communicates with the apartments of the King and Queen.

The Chapel.—Two remarkable stained windows representing Faith and Hope; the facsimiles of the tombs of Madame Adelaide and her brothers, of the Duke of Montpensier, and the Count of Beaujolais.

Kitchen.—Vaulted like crypts.

Reception-rooms.—Composed of three rooms.

Salle d'Armes (armoury).—There are a number of arms here which different sovereigns have given as presents, a musket used by Henry IV, &c.

To return to Vichy, after leaving the park turn to your right, and take the second to your left. Vichy is fourteen kilometres distant. The first three kilometres traverse the Bois de Randan,* then the road bifurcates. You keep to the right, pass through a small hamlet, Beauvezet, and for the next half mile encounter a rather steep ascent. The road does not pass through the wood, which you only enter after you have descended the other side of the hill. Until within six kilometres of Vichy the remainder of the journey lies through woods. Once out of the wood you continue along the same road, pass through one

* Since the expulsion of the Royalist party from France Randan Castle and Park are no longer open to the public (1887).

or two hamlets and eventually get into the Gannat road. Here you turn to the left, cross the Vichy Bridge, and are once more in the town of Vichy.

BILLY CASTLE.

Billy, sixteen kilometres from Vichy, can be reached by train or by taking a carriage.

The drive being the most agreeable, we will describe the route to be taken by a carriage, simply remarking that if the visitor should wish to go by train he must get out at St. Germain, and either drive or walk the rest of the way, three kilometres, following the road to be shortly described, after the carriage has reached St. Germain.

Follow the road previously indicated to Cusset, pass the Thermal Establishment Ste. Marie, and slightly to your left you will perceive the road to St. Germain. A signboard indicates the distance from Cusset to St. Germain as ten kilometres. In a few minutes you cross the Jolan, when the country becomes more open. For the next six kilometres you traverse verdant fields, and can enjoy a pleasant view of the surrounding hills. Meanwhile you pass by the village of Creuzier-le-Neuf, and close to the Château of Chermont, the residence of the Lucinge princes.

At six kilometres from Cusset the road bifurcates. Keep to the right. Three kilometres further on, you cross the railway line, enter the faubourg of St.

Germain-des-Fossés, and in a few minutes more pass under a railway bridge of the Lyons-Bourbonnais line.

From here you can pass in front of the railway station, and take the road directly opposite to it. You have now but three kilometres to cover to get to Billy. At about one and a half kilometres the road bifurcates. Keep to the left. In a few minutes more you are at Billy.

Billy, formerly one of the most important of the seventeen Bourbonnais châtelénies, has now a population of under 1000 inhabitants. In the fifteenth century it occupied an important position as a fortified town, and matters of life and death were settled here without appeal to any higher tribunal. It is said that the last death warrant was executed in 1760, when a woman was burnt alive in the market-place for having murdered her husband.

Seen from a certain distance the castle presents a most imposing aspect, and great is one's disappointment when approaching nearer and penetrating within its walls to see what a sad state of disrepair it has fallen into.

This castle was constructed in the fourteenth century, and restored somewhat in the fifteenth century by Louis III, Duke of Bourbon. It ceased to be inhabited after the sixteenth.

To visit the interior of the ruins application must be made to the Maison Morand, an inn on the right as you enter the town. This house is worthy of a visit, even if one did not require to obtain the key. It is of

ancient date, and until recently there was a little tower supported by a small statue of a man at the angle of the house, with the following inscription underneath : " L'homme est plus accablé de ces péchés que moi de ma tour." All but this writing has now been removed. Over the door of the same establishment, in old characters, is written : " Malheur à celui qui délaisse Dieu, pour servir aux richesses. Que sert à l'homme amasser bien et perdre l'âme. Dieu est ma haute tour et forteresse."

To enter the citadel one has to ascend twelve well-worn stone steps and then pass through a small door. The door is ludicrous in comparison to the massive walls on either side and above it, with their nine feet of thickness.

To the left of the entry is a small chamber, the guard-house, and to the right, immediately opposite to the guard-house, a larger construction, which is said to have been the chapel. It is difficult to conceive at the present time how this could ever have been the case. Not a sign remains which could lead one to suppose that this building had ever served for sacred purposes, the walls, in a fairly good state of preservation, being absolutely devoid of any attempt at ornamentation. The building is about twenty-one feet high, the roof being destroyed in many parts, and presenting notably a hole of over four feet in circumference.

Passing onwards one enters the court of this ancient castle, and is at once struck with its devastated appear-

ance. The interior appears to have suffered much more from the effects of time than the exterior. The walls are crumbling away, the towers, with one exception, have nearly disappeared, the battlements are more or less destroyed, and rank vegetation springs up everywhere. We should not be surprised to see the court turned into a potato field at no very distant date.

If you make the round of the court you first see on your right a small chamber, a "cachot;" further round a prison for the prisoners taken during the different skirmishes. This generally goes by the name of the "oubliette," and one is supposed, when visiting this place, to conjure up pictures of poor prisoners dying from starvation and neglect. A large and deep hole in the floor of the chamber, and which nearly absorbs the whole of this surface, is a useful auxiliary to the imagination, particularly when you are told of bones, chains, &c., having been found here.

Continuing your round, you next come to the dungeon, of which the tower is still in a pretty good state of preservation, and forms an imposing monument. Unfortunately one can no longer mount to the top. Twice has the staircase (stone) been repaired and twice has it been destroyed by lightning. Absolutely nothing remains of it now, except a few projecting stones here and there embedded in the sides of the lower steps which are amalgamated into one by decay. By the side of the dungeon is another small "cachot."

Almost in front of the entry by the side of the dungeon are to be seen the remains of a large fireplace.

From this point the low height of the walls enables one to obtain a good general view of the country, and to follow the course of the Allier in some of its windings.

In the centre of the court are two large stone balls, specimens of those employed in ancient warfare as cannon balls.

The visit to the castle being finished, the visitor should take a walk round its exterior, as he will thus obtain a better idea of its vast proportions and of the architecture.

Many of the houses in this small town present a certain interest as still preserving some remains of sixteenth and seventeenth century architecture. We have already mentioned the "Maison Morand." The "Mairie" has one of these old towers restored, which now serves as a belfry. The girls' school has an old stone staircase in a state of perfect preservation. Inscriptions in old characters may also be discovered on some of the buildings.

One should take a view from the Pont de Billy before leaving, and to vary the return journey one might cross it, and return by the left bank of the Allier, passing through Marcenat, St. Rémy, and Charmeil.

A small gratuity, 50 c. or 1 f., is expected for visiting the castle.

THIERS.

Thiers, forty-two kilometres distant by rail from Vichy, one of the most interesting excursions that can be made in the environs. The train service is not convenient, as the hours at which the trains start make it a day's business to get there and back. There is one train, however, an excursion train, at reduced rates, that runs once a week (generally on the Tuesday), from about the 16th of June to the commencement of September. This train leaves Vichy at 12.25 p.m., arriving at Thiers at 1.38 p.m. The return train leaves at 5.5 p.m., arriving at Vichy at 6.20 p.m., *i.e.* in time for dinner. Excursionists have the privilege, however, of returning by a later train if they like, 7.36 p.m., from Thiers, arriving at Vichy at 9.17 p.m. The return fares for this special train are 1st class 5 f., 2nd class 4 f., 3rd class 3 f. On other days it would be necessary to take a train leaving Vichy about 11 a.m., and the return train from Thiers at about 7.15, arriving at Vichy about 9 p.m. The single fares by this service are 1st class 4 f. 75 c., 2nd class 3 f. 50 c., 3rd class 2 f. 55 c. If you wish to take a carriage you must make your own bargain with the coachman.

By rail you pass the station of St. Yorre, and will remark on your right hand, if you sit facing the engine, the mineral springs of Mallat and Guerrier just before. Ris Châteldon, Puy-Guillaume, Noalhat and Courty follow. At this last station the line joins that

of Clermont to Thiers. The next station is Thiers. The train now changes on to another line, and goes in the contrary direction.

The scenery between Courty and Thiers is most striking,—one succession of mountains and valleys. A little before entering Thiers station you pass through two tunnels. Occasional glimpses of the town are to be had, but from no place can the whole of it be seen at once.

Thiers, with a population of 18,000 inhabitants, is the sous-préfecture of the Department of the Puy-de-Dôme. It is a very ancient town, and history tells us that it was laid waste in 523 by the soldiers of Thierry, son of Clovis. It is one of the principal centres in France for the manufacture of cutlery, having no less than 416 workshops devoted to this industry, employing 12,000 workpeople. It also has many important paper manufactories, and here much of the Government paper is made.

The town is most picturesque, the houses being built in a most irregular manner. They appear to be one on the top of the other, for the town stands on a mountain, and no attempt has been made to level the ground so as to obtain anything approaching symmetry. The streets are generally narrow and dirty, and we doubt if any other town exists where such steep ascents and descents are to be met at every turn. A walk through the town is therefore very fatiguing ; we would call it “violent exercise,” in the proper acceptation of this term, and would strongly recommend

invalids not to attempt it, but to content themselves with a carriage.

Most of the houses date from the fifteenth and sixteenth centuries. They are scattered about in a remarkable manner, some being pitched on the top of a hill, others on the slope, while some will be found in the valley. This wonderful disposition of the buildings, which adds so much to the artistic effect, and which calls forth the admiration of everyone, has caused the town to be likened to a group of houses built with cards. Withdraw one card and the whole lot will fall. One could fancy the same thing here; were one house to give way it appears certain that it would bring down the rest with it. The houses are anything but luxurious, inside or out. They are mostly timber-framed, with plaster fillings, and almost all bistre coloured. This last is one of the peculiarities of the town.

The principal objects of interest in the town are :

The Sous-Préfecture, and the *Hôtel de Ville*, which although devoid of all architectural beauty, offer a certain interest by reason of their functions.

The Château, in the Place du Piroux, dating from the fifteenth century, and *two houses* in the Rue de Lavour, Nos. 17 and 18, are interesting by reason of their architecture.

The Eglise St. Jean, in the Gothic style, dating from the fourteenth century. From the place on which it is built a pretty view of the Durole river is to be obtained.

Eglise de St. Genet.—Built in 575, by the order of

Avitus, Bishop of Clermont, upon the site which had formerly served for the old fortress, it was reconstructed in 1016 by Wido and again in the twelfth century. In the northern porch to the left on entering is to be seen a magnificent tomb of the thirteenth century.

Terrasse du Rempart.—From which a splendid view may be obtained of the whole of Limagne and the Auvergne mountains.

The Eglise du Moutier, so called from a Benedictine monastery of which it formerly formed part, dates from the eighth century, but was partially restored in the eleventh century. The tower is much more modern. By the side of the church is to be seen an old fortified gate of this same monastery. From many parts of the town very fine views can be obtained, but there is one point situated close to the Château des Ores, which is particularly renowned for the beautiful view to be had from it.

Having visited the town, much still remains to be seen in the environs. If you have but little time at your disposal, take a stroll along the banks of the Durolle, and you will be rewarded by scenery that is rarely to be met with. At every few minutes you will see small waterfalls, any number of manufactories, both of cutlery and paper, and especially the manufactory for the French bank notes. You will see horns being prepared for the backs of knives, large quantities of bones already prepared bleaching in the sun. A twenty days' exposure is enough in summer if

the weather be fine to bleach them. At other parts you will see millstones being prepared. We think the walk along the river, with all the animation which the different industries there pursued calls forth, the beautiful valley, and the mountains on every side, in no way inferior to visiting the curiosities of the town ; we would even say that it is much more striking, certainly less fatiguing, and more beneficial to the health.

A pretty walk is to cross the Durolle at the foot of the town near to the Église du Moutier, and then follow the right bank and pass the Degoulat and Pont Haut hamlets.

No one with time at his command should leave Vichy without visiting Thiers. It is a *multum in parvo* for curiosities and scenery, and although Vichy is so rich in excursions of every kind that it is difficult to find time for them all, particularly if one has come as an invalid and is under treatment, we think that this one is the finest, and that the visitor will be well rewarded for any little inconveniences that the distance from Vichy to Thiers may occasion.

LA PALISSE,

Situated twenty-seven kilometres from Vichy by rail, can be reached either by taking the train to St. Germain-des-Fossés and from there changing for the Bourbonnais line (Lyons, St. Etienne, Roanne, Paris) or by taking a carriage. Whichever means be

adopted, an entire day is necessary for this excursion. There are no trains for La Palisse between the hours of 10.35 a.m. and 3 p.m. from St. Germain, and no return trains between the hours of 2.6 p.m. and 7.23 p.m. It is therefore necessary for one to leave Vichy by the 8.56 a.m. or 10.5 train, to catch at St. Germain either the 9.24 a.m. or 10.5 train if one wishes to return by the 2.6 p.m. train from La Palisse. Otherwise one would be obliged to dine at La Palisse. The earlier train is preferable, as it gives more time, and allows the excursion to be managed with more ease.

From St. Germain the train takes about thirty-five minutes to cover the seventeen kilometres. There is only one intervening station, Saint Gerand-le-Puy, a small town of some 1800 inhabitants and distant about five kilometres from the station. It possesses a small castle of the fifteenth century, and a church of the tenth century, with some very well-preserved mural paintings. La Palisse is ten kilometres further on, and is reached about a quarter of an hour later.

If one chooses the more agreeable way of locomotion, viz. a carriage, it is necessary to pass through Cusset and make for the Rue du Faubourg Saint Antoine, which leads direct to the La Palisse road. About midway the village of Bost is passed (eleven kilometres). Shortly after leaving the village you cross a small stream, and a little beyond, to your left, will be seen the Beaumont castle among the trees. The road becomes after this rather steep, then slopes down and meets the road of Varennes à la Palisse. Turn

to the right, and in ten minutes you are in the Grande Rue de la Palisse. At the end of this street, after crossing the River Bébre, you will be by the side of the castle.

If you have come by rail you have two kilometres to walk before you get to the town, or you can take an omnibus, for which the fare is 50 c. per passenger.

The road to the town is immediately in front of you as you quit the station. It is bordered on either side by a double row of trees, and if time permits is an agreeable walk. When at the end of the road turn to your right (you will see the castle at the bottom of the street), cross the River Bébre, then turn to your left (Rue du Commerce), and follow upwards until you arrive at the Church of La Palisse.

La Palisse, a town of some 3000 inhabitants, is a "chef lieu" of the arrondissement, and presents but two objects of interest, the château, pitched on the summit of a hill, and the church. Important fairs are held in the town about twice a month, when a very large business is done in cattle. The town itself is the seat of several small manufactories in prints, sheetings, wooden shoes, &c.

The church is only worthy of a visit to note its disgraceful, and probably intentional, state of dilapidation. More than one half of it is inundated on a stormy day, the roof is full of great holes, the plaster has fallen long since, laying bare the rafters, and every now and again while walking about the place you may hear, and perhaps feel, some of the roof

giving way. A notice is stuck up in the church by the side of a money box that contributions will be received for the building of a new church, and probably it is supposed that the charitably inclined may be more liberal if things are allowed to go on from bad to worse.

The entrance to the castle is opposite to the church. An effective lodge is being built at the entry. The castle is built of stone and brick. It presents two faces, one turned towards the tower, the other facing the park. It is a very imposing and handsome monument with its numerous turrets and towers.

We take the following extract concerning its history from what M. A. de Conty has written about it : (translated.)

"The documents concerning the history of La Palisse do not date back further than the thirteenth century ; the name is even ignored of the founder of the castle which existed at this period.

"What one can assert, however, is that in 1230 it belonged, as well as the Seignory, to Roger de la Palice, and later, in 1430, to the celebrated Jacques de Chabannes, commandant of the advanced guard of Joan of Arc in the siege of Orleans, who was mortally wounded in the siege of Châtillon, and whose body was brought to La Palisse, and interred in the chapel, where the tombstone is still to be seen.

"The grandson of Jacques de Chabannes, Jacques II, Marshal of France, who added yet more renown to the name of La Palice, and increased the size of the

castle by uniting it, on the side of the town, to the chapel.

“The body of Jacques II, killed in front of Paris, as well as that of his grandfather, were brought to La Palisse, and a magnificent tomb was raised over them, which was destroyed, however, during the Revolution.

“Later on, the domain of La Palisse, through different alliances, passed to the House of Tournon, then to that of Guiche, who modified the castle, changed the disposition of the park, and rased the greater part of the fortifications. In 1713 it was given to the Rohan-Soubise family by one of the descendants of the Guiche, who took the veil.

“Two years later, the Rohan-Soubise family sold this domain to Alexis-Gilles Brunet d’Evry, who, in 1731, resold it to the Chabannes family.

“Thenceforward the castle has never ceased to belong to this family, except during the Revolution; but as the local authority had occupied it during this time, and used it as a tribunal, it was not sold, and the Chabannes were able to reinstal themselves in 1802, after their return from emigration.

“The present proprietors for a long time past have been occupied in restoring it. This work is proceeding, unfortunately, but slowly.”

The first room shown is the dining-room. In it you will perceive two large portraits, one of the Marshal Chabannes and another of his wife. The dining-room communicates with the drawing-room by

means of an ante-room. Against the wall is a beautiful tapestry from the Gobelins manufactory. There are four other tapestries of the same kind, which are not exhibited, being intended for the walls of the dining-room, which is being restored at the present moment, and which will replace later on the present dining-room.

The ceilings in these two rooms and in the drawing-room are most handsome, and give one an idea of what the castle must have been in former times, for although it is still most tastefully and elegantly furnished, most of the ancient souvenirs and "meubles" have disappeared, having been stolen during the Revolution of 1793, when the family was exiled. All, however, has not been carried off, or if carried off has been acquired again. Thus in the drawing-room are two or three pieces of old furniture in carved oak dating back to the fifteenth century. In this room are the portraits of Gilbert de Chabannes and his two wives. The fireplace is a monument; the sides are covered with ancient oak carvings, all in a thorough state of preservation. The upper part is modern. The walls have a pretty and effective style of tapestry, which is modern. An ancient picture, the crucifixion of our Saviour, where the soldiers are seen with cards in their hands playing for the share of our Saviour's raiment, merits a few minutes' attention.

From an upper chamber one passes (by means of a spiral staircase) to the leads, from whence one obtains a view of the country and of the course of the

Bébre. The country round is not particularly beautiful, but the view is most extensive.

To visit the chapel one has to quit the castle and make a few steps in the garden, as the communication between the two is for the present done away with.

To enter the chapel you pass by what was prior to the Revolution the “escalier d’honneur.” Before entering remark the portico, a handsome stone staircase. The chapel is in a very dilapidated state, the walls are cracked, though in many places they have been strengthened by supports; all the stained windows have disappeared, and are now replaced by ordinary white glass. In the chapel are the tombstones of Marshal Chabannes and his wife, which have been stolen three successive times and as often repurchased. They have been somewhat damaged in these removals, and have been partially restored. The mortal remains of the Marshal and his wife are really at Versailles. There are two altars. In the vestry are the remains of the old pulpit, &c.

After the chapel a short walk round the grounds, and you have seen all that is to be seen of interest at La Palisse.

In closing what we have had to say upon La Palisse castle, we should tell intending visitors that it is not a public show-place. The Marquis and Marchioness live in the castle, and they have to be asked for permission to visit; but they are most courteous and always ready to gratify the legitimate curiosity of visitors who come to inspect this mansion. The

custom is to give a gratuity to the servant who accompanies you.

EFFIAT,

One of the prettiest drives in the environs of Vichy. About eighteen kilometres distant. The only means of getting there is by taking a carriage, as it is seven kilometres from the nearest railway station (Aigueperse).

Crossing over the Allier bridge, you follow the route to Gannat until you are opposite to the Vesse Spring ; you then turn to the left and take the road to Serbannes.

For the first three kilometres the road lies uphill, and resembles somewhat a country lane, but afterwards it runs through a wood. After about four and a half kilometres you pass by the side of Serbannes, which is to your left. You must not go through this village, as it will take you off your road, but continue straight on. For nearly two kilometres already you have been passing through the woods, and your road still continues through them for another eight kilometres. The way cannot be mistaken ; it is perfectly straight, and you must avoid turning either left or right. Once out of the wood the country becomes open and the road uninteresting, until you arrive at Effiat, some seven kilometres further on.

The town of Effiat numbers somewhere about 1400 souls. A small town, it has only a church and a castle

worth visiting. The church is situated to the right of the high road, after you have proceeded to the extremity of the line of houses which flank this same road.

It is devoid of any architectural beauty. Its exterior is more striking than the interior, which from its bare appearance, the almost entire absence of pictures, the stained and discoloured walls, would make one think that its exchequer was not in a very flourishing condition.

Upon leaving the church you will perceive on your right a small door opening into a narrow passage through the fields to the château. You will pass through it, remarking while so doing the high walls which formed the boundaries of the moat in times past.

This passage will lead you to the principal entrance of the castle, a massive iron gate. On either side of the entrance is a large dog kennel, in which you will usually see a large number of hounds.

When you reach the château it is necessary to send in your card before permission can be obtained to visit it.

In the sixteenth century this castle belonged to the illustrious Antoine Coiffier-Ruzé, born in 1581, Marshal of France and Governor of the Bourbonnais for Louis XIII, who received it from his maternal ancestor, Gilbert Coiffier. One of the sons of the Marshal, Cinq Mars, died on the scaffold along with De Trou for the part he had taken in a conspiracy against the Cardinal Richelieu.

lieu ; another was accused by Saint Simon of having poisoned Madame with the assistance of the Chevalier de Lorraine ; while the third son distinguished himself by his licentious and scandalous proceedings. At a later period this property passed into the hands of Law, who, running away in debt, virtually abandoned it to his creditors. M. Boucart acquired it in 1844, broke up the park in lots and sold it piecemeal. Some of the antique furniture was bought by the Government for the Cluny Museum of Paris. It is now inhabited by M. Mororges, who has restored it in part.

There is nothing very striking about the exterior of the castle, and of the inside only a few rooms can be visited as the castle is occupied by the present proprietor and generally by a number of his friends.

The salles d'armes in the centre of the building on the ground floor dates from 1636.

It is a spacious apartment which has been converted into a billiard-room. From this room one passes into "le grand salon." Some half dozen large and very handsome pieces of tapestry, dating from the commencement of the sixteenth century, hang on the walls. One or two pieces of old furniture will also be seen.

On either side of the chimney-piece is a portrait, one of the Marshal and the other of Cinq Mars.

The bedroom of the Marshal d'Effiat, the salles des gardes and the chambre des évêques are worthy of a visit but are not always open to the public.

On the whole the sight is disappointing. The modern has almost everywhere replaced the ancient,

and one fancies oneself at times visiting simply an old country mansion.

The garden, with its pieces of artificial water, is laid out with taste.

One leaves the castle by the iron gate above mentioned, but instead of taking the small passage traversed on entering one follows an avenue of very handsome chestnut trees which leads direct on to the high road.

The return journey can be made by the Gannat road, by passing through St. Genest-de-Retz (four kilometres), and thence taking the high road to Gannat, turning to the right ; four kilometres more and one is at Gannat. If time permits a visit may be made to the Pont de Rouzat from Gannat, or a return to Vichy by the road to Vichy ; after compassing a distance of seventeen kilometres you reach the Gannat road, you then turn to the right and in ten minutes are once more on the other side of the Gannat road. As this last exercise increases by some twenty-four kilometres the distance to be gone over, it will be necessary to come to an understanding with the coachman before starting and also to devote an entire day to the promenade.

GANNAT—PONT DE ROUZAT.

Gannat is eighteen kilometres distant from Vichy, the Pont de Rouzat seven kilometres beyond Gannat.

This excursion can be made by train, viâ St. Ger-

main, by carriage or by diligence. Neither by the train nor the diligence can one go further than Gannat. To get to the Pont de Rouzat it would be necessary to take a carriage from that town, or if the visitor is a good walker he could easily manage it on foot, the return journey being but fourteen kilometres. Three hours would suffice to go there and back on foot.

The diligence for Gannat passes at about 8.30 a.m. by the Carrefour des Quatre Chemins, where it waits a few minutes to pick up passengers. Its starting-point is from Cusset. The single journey costs 1 f. 50 c.

There is another way of going, by taking the train, passing, of course, by St. Germain to St. Bonnet, which is at about one and a half kilometres from the Pont de Rouzat; but this is a tedious journey.

Before describing this excursion we would say at once that we consider it should be left as one of the last to be undertaken as being one of the least interesting. The eighteen kilometres' drive to St. Germain on the high road is very monotonous after the three or four first kilometres, and it is only upon nearing the Pont de Rouzat that the scenery becomes really fine. It may be one way of taking the fresh air, but we would recommend, Randan, Maulmont, L'Ardoisière, Effiat, &c., as being much more hygienic and agreeable. In these excursions one is constantly passing through woods, the air is soft and perfumed, whereas on the road to St. Germain, after the first few kilometres, there is no defence from a broiling sun and

pecks of dust. It is an excursion, however, very much *à la vogue*, so we shall proceed to describe it.

The first part of the road is the same as that taken for the Puy-Grenier and already indicated,—cross the Vichy bridge and follow the road to Gannat. After two kilometres there is a steep ascent, and at about five kilometres from Vichy you pass on your right hand the road for the Puy-Grenier. Thenceforward, the road is almost straight, there are a few up- and down-hills, and at nine kilometres from Vichy you pass through

Cognat, a small village of which the population is under 1000. It has a small church of the twelfth century, which is worth a visit. The steeple has been restored, having been struck by lightning. This village has a certain historical fame, as it was here that the Prince de Condé, at the head of the Protestants of France and Germany, in 1568, beat the Catholics, led by Montaret, Lieutenant of the Duke of Nemours.

At some little distance from Gannat, on the right hand side, about two hundred yards from the high road, one passes the Château de Fontorte.

Just before entering Gannat one crosses the railway line of St. Germain-des-Fossés to Clermont.

Gannat, from the Latin “*Gannapum*,” “*Gannatum*,” is a small town of some 5500 to 6000 inhabitants. Situated upon the Andelot at the foot of the hills, it dates back to a very early period. It was one of the ancient fortified towns of Auvergne, though the only remains of the fortifications now to be seen are two towers in

ruins and the castle, with its four towers, which serves as a prison.

The only thing worth a visit in this town is the church, *Eglise St. Croix*. This historical monument dates from the eleventh century. Of the original building there remain but three chapels and a part of the choir, the rest having been restored in the fourteenth century. This accounts somewhat for the want of harmony which prevails in this church.

To the left, on entering, will be seen a large picture, the "Adoration of the Magi," signed, "Guido Franciscus Aniciensis." Some people have attributed it to the famous painter, Guido, but it has been conclusively proved that it is the work of a painter of Puy. Some of the stained windows are very handsome and are by Jacques du Paroy. They are: St. Ambroise, St. Augustin, St. Jerome and St. Gregory.

At the back of the altar you will remark a picture of Ste. Procule. She is decapitated and holds her head in her hands. Again, near to one of the bénitiers, you will see a figure, likewise decapitated, and holding a head in its arms. This is also Ste. Procule, and we were grieved to see how shabby her clothes had become. There is a money-box at her side, the contents of which are said to be for the poor, but we think that a portion might be appropriated to the purchase of a new dress for her, particularly as her history is most pathetic.

Ste. Procule was a young lady of noble birth whom

the Count Gérard d'Aurillac asked in marriage. The damsel refused, preferring to devote her life to prayer, to fasting, and deeds of piety in a grotto. Gérard followed her, and not being able to overcome her resistance, he cut the matter short by lopping off her head. The legend adds that Ste. Procule quietly picked up her head and carried it to the Gannat Church.

Gérard was struck blind, and, deeply penitent for his ungentlemanly conduct, founded an abbey.

At about one kilometre from Gannat is to be seen the "Chapelle de Ste. Procule."

To get to the Pont de Rouzat, seven kilometres distant, you follow the road to St. Bonnet, which is by the side of the railway line. After about four kilometres you cross the Montluçon line by a level crossing; the road then takes a sharp curve, and there is a complete transformation in the scenery. Before you is a deep valley, on either side are high hills, and at no great distance you see and hear the River Sioule. In a minute the handsome bridge, Pont de Neuviat, comes in view. This bridge is more than sixty yards in height if measured from its central pillar. It is made of iron supported by masonry on either side, with a strong buttress in the middle. The span of the bridge is considerable, and as the road bends here you have to pass twice through its arches to continue your way. From this point until you reach the Pont de Rouzat the scenery is wild and captivating. It now lies along the side of the Sioule, and nothing could be more

charming than these three kilometres which separate you from the Pont de Rouzat.

The Pont de Rouzat, the next bridge, is very similar to the last, only higher, being at an elevation of seventy-six metres. The span is also greater. It is constructed of iron, and appears most light. It is, however, of the strongest construction, two iron supports being placed between the extremities, which are embedded in huge masses of masonry, and these in their turn are dovetailed into the rock. The supports are composed of four iron pillars, placed perpendicularly at a certain distance the one from the other, and united by means of iron girders. Each support represents a kind of square column, of which the base is larger than the apex. One of these supports is placed in the centre of the torrent, the others on the road. Immediately after passing through the railway bridge you get on to a bridge crossing the Sioule. If you have time you may push on to Veauce, distant about nine kilometres, otherwise you must return by the road you came.

BOURBON-BUSSET CASTLE.

Situated at twelve kilometres from Vichy. There are many means of getting here, by private carriage, by omnibus, or by train to St. Yorre, and a walk from this station of four kilometres.

The four-horse omnibus leaves Vichy daily from the Place de la Marine at 11.15 a.m., arriving at

Busset at 1, and returning to Vichy viâ L'Ardoisière at 3 o'clock. The return fare is 3 f. 50 c.

If you go by train you should leave Vichy at 11.29 a.m., dine at Busset, and return by the 9.1 p.m. train. This, however, being hardly practicable we shall describe the carriage drive.

You leave Vichy by the road to Nîmes, which you follow until you arrive in front of the Parc Larbaud at St. Yorre, eight kilometres distant from Vichy. The road so far has for the most part been through vineyards following closely the River Allier, and being very much higher than the river, admits of a beautiful view the whole time. You pass on your left within about half a kilometre La Côte St. Amand, as you go through Abrest, distant three kilometres from Vichy; one kilometre further on and you are just opposite to Hauterive, on the side of your river to your right. At about eight kilometres from Vichy is—

St. Yorre, a small town of but three to four hundred inhabitants; it is destined to become an important station some years hence on account of the number of mineral springs lately discovered there, most of which are excellent for exportation.

You should visit the Park of Larbaud-St. Yorre if you have time. It has a vast area, and has in its grounds six different springs: the Nouvelles Sources de Vichy, comprising three springs, the Puits Artesian, the Old Source, St. Yorre, and Source des Acacias. In the vicinity are the three Springs of the Pioniers, and the Spring des Graviers, belonging to the same

proprietor. Also the Springs Mallat, Guerrier, a spring belonging to the Thermal Company, &c.

At a short distance beyond the Larbaud Park, and on the left hand side of the Route de Nîmes you will come to a road which leads direct to the castle. It is very circuitous, and more or less uphill the whole way. From St. Yorre to Bourbon-Busset by this road is about four kilometres. Before getting into the village of Busset one perceives the castle perched high up on a hill, and commanding the whole surrounding country.

Busset is a very small village, and of no importance. There is nothing interesting to be seen other than the castle, to visit which it is necessary to ask permission. This, however, is a simple formality, and admittance is never refused to visitors who come between 1 and 4 p.m.

Busset Castle is a feudal one. Two large towers protect the entrance, and a drawbridge has to be crossed before it is possible to penetrate into the castle. This takes you into the court of honour.

The history of the castle cannot be traced back farther than the fourteenth century. In 1374 it belonged to Guillaume de Vichy. It successively passed to the d'Allègre family, and to the Bourbon-Busset family by a marriage between these two families, Marguerite d'Allègre becoming the wife of Pierre-de-Bourbon, eldest son of the famous Louis-de-Bourbon.

Pierre-de-Bourbon, by his marriage with Marguerite d'Allègre, became the founder of the Bourbon-Busset

House. His efforts to get the legitimacy of his birth* recognised by Louis XII were fruitless.

His son Philippe, who married Louise Borgia, daughter of the famous and redoubtable Cæsar Borgia, was more successful in his appeal to Francis I in 1518.

Intermarriages afterwards took place with the Larocheoucauld family, the Montmorillon, Clermont-Tonnerre, Lafayette, and Gontaut-Biron families. The present proprietor, Count Charles Robert de Bourbon-Busset, is the grandson of François Louis Antoine de Bourbon, who made himself famous in the latter half of the eighteenth century by the brilliant part he took in the wars of the Empire.

The entrance to the castle dates from the fifteenth century, and the fortified gate is worthy of more than a passing glance.

Crossing the drawbridge into the cour d'honneur, you see before you the castle and the chapel. The castle proper is composed of two wings, united by a pavilion, called the clock pavilion (Pavillon de l'Horloge). The whole building partakes of the modern Gothic style, and is somewhat severe in its architecture as seen from this part.

To the right is a massive tower, known by the name of the Tour de Riom, very much higher than

* Louis-de-Bourbon, who at eighteen years of age was already one of the high dignitaries of the Church at Liège, threw up the episcopal throne to marry Catherine d'Egmont, widow of the Duke of Guelche, without obtaining his father's permission, or that of the King of France. Three sons were the issue of this marriage, and because of the informalities in the marriage were considered illegitimate.

the other towers. It commands an extensive and very interesting view. This is of the fourteenth century.

The Tour de l'Horloge to the left, which unites the preceding to a wing containing the chapel, is of much smaller dimensions.

The flooring of the vestibule is of finely inlaid mosaic.

To visit the interior the tourist enters the Riom Tower, and by a very handsome staircase reaches the first floor, containing the apartments which have been restored. A gallery runs along the whole of them, giving access to

The drawing-room, in which the ancient chimney, a beautiful oaken chest of Louis XII's time, and a number of handsome vases attract the visitor's attention. From the drawing-room one can pass on to the terrace and enjoy a view of the grounds and the environs. The Bourbonnais plains, the fertile valley of Limagne, the Puy-de-Dôme, the Forez mountains, and the famous Montoncés can all be seen. From the drawing-room one passes to the billiard-room and library, where are many handsome pieces of furniture of carved oak.

The dining-room is a spacious and lofty apartment, in which most of the furniture is of the fifteenth and sixteenth century, though the table and buffet are modern. The fireplace is most tastefully enamelled in blue and gold. You next enter a

Bedroom, said to have been inhabited by Henri IV.

The bed is ancient, as well as the prie-Dieu. You will remark a tapestry given by Charles X to Madame de Gontaut.

The old drawing-room is contiguous to the bedroom. It is decorated after the style of the Empire, and contains some of the family portraits.

The picture gallery has some good pictures. You are invited here to write your name in a book.

The chapel serves for the inhabitants of the adjacent country, the “tribune” alone being reserved for members of the Bourbon-Busset family. It is very simple in its architecture.

The last piece to be seen is a second bedroom, also containing some handsome furniture.

Instead of taking the same road back to Vichy it is usual to return by L'Ardoisière, which is only distant some three miles.*

CHÂTELDON.

This place cannot be easily visited by train, as the hours are most inconvenient, and it can only convey one as far as Ris-Châteldon, which is about four and a half kilometres from Châteldon. Those, however, who prefer the train, must leave Vichy at 11.22 a.m., arriving at Ris at 12 o'clock. There is only one intermediate station, that of St. Yorre. They may then take an omnibus to Châteldon (when there is one to

* Since the expulsion of the Royalist families from France Busset Castle is no longer open to the public (1887).

be had, which is not always the case), fare 30 c., or walk. The wood is very easy to follow. Keep the high road to Nîmes, turning to your right as you quit the station, for about a kilometre, when you will come to a turning on your left hand, with a signpost indicating the road to Châteldon, which is three kilometres further on. This turning will lead you direct to the village. The road is straight from here, and rather monotonous. The only train one can take to return is at 8.30 p.m.

The best means of visiting this place is to take a carriage; the distance is only just over twenty kilometres.

The road is the same as that described for Busset as far as St. Yorre, but, instead of turning to the left soon after passing the Larbaud Park, one continues along the high road until one reaches the Ris-Châteldon station. The rest of the way is the same as that already described as if the train had been taken. Between St. Yorre and Ris-Châteldon you pass through the small commune of Maison Blanche.

Châteldon is built on the banks of the Vauziron, on a granite soil upon the extreme confines of the Forez, Bourbonnais, and Auvergne mountains. It is surrounded on every side by vineyards and produces one of the best wines in Auvergne.

It is called a town, but in reality is little more than a village, numbering about 2000 inhabitants. It is interesting from its quaint old houses, its castle, church, and belfry.

The houses have little pretensions to architecture, but they are very ancient, with timber frames arranged in every variety of form, in crosses, squares, and lozenges, the intervals being filled in with plaster. The Maison Sergentale, situated at the angle of the rue des Boucheries, presents one of the best types of this kind of house that can be met with in the town. It was built at the end of the fifteenth century upon the same ground as the small château belonging to the Seigneur of Châteldon. It was formerly occupied by the lower rank of officers attached to the local justice courts.

The inhabitants have a poverty-stricken appearance ; the streets are ill-paved, dirty, and badly kept. The principal street, which has no official name but is usually known as the rue de la Tour, has a brook running through the entire length, and taking up half the way. The houses on one side are all connected with the other half of the road by stone bridges, each house having its own particular bridge. These bridges, of a single span, are very massive and strong and give a peculiar air to the street. Many other streets have streams running through them, but none of them have this arrangement of bridges.

In the Middle Ages, Châteldon was an important commercial town, and had for motto, "Châtel ondon" (little town and great renown). A series of epidemics decimated the population ; those who survived emigrated, and the industry of the town, chiefly cutlery, was transferred to Thiers.

Châteldon is one of the most picturesque types of an old feudal Auvergnat town, and offers in this respect much which will interest those who take a delight in antiquities.

The church, on the left, is the first building of any consequence one comes to upon entering the town. The exterior is of a dirty black aspect quite in keeping with the rest of the buildings. It is within the old walls of the town and belonged to a convent of Cordeliers, founded by Philippe de Vienne in 1463, Seigneur of Châteldon and of Listenois, and by Petronille de Chazeron, his mother. The entry has yet a few remains of sculpture in stone, but they are much damaged by time.

The interior is divided into three aisles. In the principal one are to be found copies of some of the paintings of the great Italian masters.

The pulpit (seventeenth century) is of oak and has five carved figures upon it. The panels forming the side of the stair leading into the pulpit have also a little sculpture about them.

The chapel dedicated to the Virgin, and the chapel opposite to it, have a few small figures painted upon the ceiling. The whole church has a look of poverty about it ; the walls and roof are cracked in many parts, and the benches and chairs are such that the wonder is they can still serve.

The castle has an imposing appearance when viewed from a little distance, but one sees, on nearing it, that its condition is wofully dilapidated. Though in-

habited, no attempts appear to have been made to stay the work of time upon it.

The road thither is rather steep. You pass through an iron gate, follow a wide path in the grounds which leads straight up to the castle and takes you to the ancient entrance, where formerly a drawbridge existed, but which has been done away with long since, and is now represented by an ordinary stone road.

In the middle of the court is a deep well which is said to contain 200,000 quarts of water. There are parapets all round the court of honour, from which one has a very good, if not a very lovely, view of the small town.

There is a complete want of luxury in the interior of the castle, very little furniture and that of no interest. The rooms are very indifferent.

By a spiral stone staircase one ascends to the loft, which, with the cellars, is what is most worth seeing. One might fancy oneself in the interior of a ship in course of building turned upside down, the skeleton alone being completed.

In descending you pass by what has been the ancient chapel ; there are still many remains of mural paintings, but most of them are quite effaced by the action of the damp and rain, from which the dilapidated condition of the roof has offered but little protection.

The cellars, whose handsome roof and galleries give them quite a church-like appearance, are well worth a visit. Unfortunately the most interesting and the

greater portion cannot be visited, as it is full of water some two or three feet deep. The guide, however, will give you an idea of the beauties of the inaccessible part by throwing a lighted paper upon the waters. It is a sad pity that no care is being taken of these cellars, for with a little trouble and at a small cost they could be dried and cleaned. Rarely will you come across any cellars on which so much architectural skill has been lavished.

The Tour de l'Horloge, or belfry, a striking monument of quadrangular form, is quite close to the church, and merits inspection.

Châteldon has still a certain renown, which as time goes on is likely to increase. This it derives from its mineral springs, of which it possesses four,—the Source St. Eugénie, le Puits Rond, le Puits Carré, and la Source Nouvelle. They are situated at about ten minutes' walk from the town, and, if time permits, may interest the visitor.

CLERMONT-FERRAND.

On account of its distance from Vichy it is hardly possible to go by carriage unless one is prepared to stop there two days.

The only available train is that leaving Vichy at 7 a.m., and St. Germain 7.33 a.m. By taking this train it is possible to visit Clermont-Ferrand, Royat, and the Puy-de-Dôme all in one day, returning to Vichy either by the 5.34 (parly.), or 8.55 p.m. express

from Clermont, reaching St. Germain at 7.50 and 10.4 p.m., and Vichy at 9.3 and 10.42 p.m.

The first part of the journey has already been mentioned in our description of Gannat, which one has to pass. The distance by rail from St. Germain is sixty-five kilometres, and the duration of the journey about two hours and a quarter. To this distance must be added the ten kilometres from Vichy to St. Germain, and an allowance of at least one hour has to be made on an average for this little bit of the journey, owing to the delay at the latter station.

After passing by the following stations : St. Remy, Monteignot-Escurelles, and Gannat, the line runs by Aigueperce, Pontmort, Riom, and Gerzat, the next station being Clermont. The scenery is very varied, and will not fail to charm the traveller. Near to the line are fertile fields, where the golden tint of the ripe corn predominates and is set off to advantage by a good sprinkling of vineyards. In the background are high mountains, whose summits are frequently enveloped in mist.

Clermont-Ferrand, the “chef lieu” of the Department of the Puy-de-Dôme, has a population of 43,000. It is built at an altitude of 407 metres upon a hill, at the foot of which flows the Tirtaine. Hills surround it on every side.

The town covers a considerable extent, and boasts many fine, large, and open streets, avenues, and boulevards. The greater part of the houses are large, substantial, and well built.

The principal industries are pottery of a coarse kind, the manufacture of different kinds of pastes such as the “*pâte d’Italie*,” india-rubber goods, &c.

The principal curiosities to be seen are :

The Cathedral, a magnificent historical monument belonging to the thirteenth and fourteenth centuries. Some time before entering Clermont this cathedral can be seen from the windows of the railway carriage. By its lofty spires and large size it seems to dominate the whole town.

It is of Gothic architecture, and was commenced in 1248, under the direction of the architect, Jean Deschamps, being consecrated in 1348, but, like most of the French cathedrals, it is still unfinished. It has a very handsome exterior, and its two spires, eighty metres high, are as striking as they are graceful.

The interior presents many points of interest ; the grand lofty roof, and the handsome stained windows cannot fail to fix one’s attention as soon as one enters the building. More carefully examined, there is much of interest to be seen here.

On the left of the entrance you will remark, in one of the side chapels, a most elaborately carved group in oak, representing the Twelve Apostles. Another carved oak picture represents a Confirmation scene. Both are works of the thirteenth century. If you now turn round and cross to the other side of the cathedral you will face a magnificent stained window representing the marriage of St. Louis.

Making your way a little further round, you will

see on the wall an ancient clock, captured from the town of Issoire during the religious wars. It is what is termed a "jacquemart," *i.e.* a clock with figures. These figures are about life-size, and represent Mars, Time, and Fame. Mars is most to the left, Time in the middle. Every hour the figures strike Time with iron hammers.

If you penetrate the aisle you will notice a mural painting, in great part effaced, and over which another picture had been painted. The entire altar is of gilded brass, the lower part being of very delicate workmanship and beautifully chiselled. It belongs to the thirteenth century, as does also the cast-iron door round the aisle.

The confessionals are all of carved work, some of them real works of art. The stained windows are of the same epoch, though here and there slight restorations mar the symmetry, part of the original having been broken.

In a side chapel, at the back of the high altar, is another of grey marble, upon which are sculptured the Twelve Apostles. This carving presents particular interest in that it belongs to the fourth century. It was placed in the cathedral in the thirteenth century, and its preservation is perfect. There are many other most interesting things to be seen here, but we must content ourselves with noting one more. This is the chapel of St. Pierre, where a splendid carved oak of great dimensions represents the Twelve Apostles. Besides the value attached to ancient sculpture in

general, it has another and exceptional merit in that the carving is executed on one piece of wood. Opposite to it is to be seen a picture of the martyrs.

This is the principal sight in the town, and should satisfy the visitor if he intends to do Royat and Puy-de-Dôme on the same day. If, on the contrary, he intends to pass a couple of days at Clermont there are still one or two things worth seeing.

Notre Dame-du-Port, another historical monument, the most ancient and perhaps the most perfect type of what is called “Romane-Auvergnate” architecture of the tenth and thirteenth centuries. The outside may not be very imposing, but there is much to admire within. The church of St. Pierre-des Minimes, built in 1630, possesses two fine pictures.

Ste. Marie, an old Dominican church, of the early Gothic style, built in the beginning of the thirteenth century. It possesses two very handsome tombs of the fourteenth century.

The Préfecture, the Hôtel de Ville, Palais des Facultés, and some old houses, notably the Maison de Pascal.

The Fontaine de Jacques d'Amboise, erected at the commencement of the fifteenth century, situated in the Cours Sablon, with its three superposed basins.

The statues of *Desaix* and *Pascal*, in the Place de Jande and the Place de St. Hérem.

The Museum, which contains many valuable pictures.

The Petrifying Fountain of St. Allyre.

Close to this last are the *Pont Naturel* and *Grottoes*

of St. Allyre in the Rue du Pont Naturel. There are four grottoes in which different objects are constantly being submitted to the petrifying process. In the garden are to be seen a cow and its calf, a horse and some half-dozen personages of natural size, dancing one of the Auvergnat dances to the tune of a fiddler. The Pont Naturel is a bridge which has been formed entirely by the action of these petrifying waters. It was formerly known as the "Devil's Bridge."

The *Hôtel Dieu* hospital, the *Barracks*, and some similar institutions, are not to the taste of everyone, so we refrain from giving any details concerning them.

ROYAT.

The best way of getting to Royat is by train to Clermont-Ferrand, and from this station either walking or taking a cab. The distance is about three miles. Cab fare is 3 f. in the daytime, and 4 f. from nine o'clock in the evening to five o'clock in the morning. Trams and omnibuses from the interior of Clermont leave every few minutes for Royat. The fare is 25 c.

Should you prefer to walk, ask to be directed to the Avenue de Royat, whence you will have no difficulty in finding your way, as this road leads direct to Royat.

The walk is somewhat uphill the whole way, much exposed on a bright sunny day to the direct rays of

the sun ; it is not then to be recommended, but in cooler weather it is an agreeable promenade.

Royat, one of the French thermal stations, dates from the Roman era. Quite recently the Royat Thermal Company, during the progress of certain works undertaken with a view of embellishing and increasing the size of the park, came upon the ruins of what had once been the Roman thermal establishment. Royat has a population of between 1400 and 1450 inhabitants, and derives its importance from its mineral waters.

It possesses seven mineral springs, of which it will suffice to give the names.

The Source Eugénie, which has the extraordinarily large output of 1,400,000 quarts per twenty-four hours, the Source St. Mart, Source St. Victor, Source du Médecin, Source Marie-Louise, Source Fonteix, Source César.

Royat has many beauties, natural and artificial. Few places can boast so charming an array of villas and houses. The hilly nature of the ground and the rich growth which overspreads it combine to make Royat a lovely spot for a summer excursion.

The town, or rather village, is somewhat limited in size, and may be considered almost a suburb of Clermont from the constant traffic which goes on between the two places.

In Royat itself there is but little to visit other than what pertains directly or indirectly to its thermal springs.

The church is an historical building of the twelfth century. Its crypt dates from the eleventh century. The belfry is modern and in the Roman style.

In the centre of the town is a beautiful Gothic cross erected in 1646 and restored in 1881, upon which are carved the Twelve Apostles.

The Casino, well in keeping with its surroundings, is in the form of a châlet and has been considerably enlarged during the last few years. The park containing the Source Eugénie is very tastefully laid out. Musical concerts are given here daily.

What will most interest the stranger whose time is limited is the famous Grotto St. Marc or, as it is now commonly called, "The Dog's Grotto." This is within but a few steps of the thermal establishment, and has been compared to the Dog's Grotto near Naples. The comparison is not far-fetched, for they present the same phenomena, being essentially characterised by the escape of carbonic acid gas from the soil, the effects of which upon the organisation are naturally the same in both places. For those of our readers who may not have visited the grotto at Naples we will give a brief description of the one to be seen at Royat.

The St. Marc Grotto is an excavation of eighteen metres large and eight deep, of which the roof is formed by some of the enormous scoriæ vomited by the Gravenoire volcano when in activity. There is a great escape from the soil in summer of carbonic acid gas, which, being heavier than the atmosphere, forms a dense layer at some distance from the soil. The

height of this layer varies with the temperature and the height of the barometer. The higher the temperature and the lower the barometer, the higher will be the height of the layer of this gas ; it disappears when the temperature is under 41° F., and in winter is often entirely absent or at any rate cannot be recognised.

Carbonic acid gas, as everyone knows, is unfit both for respiration and combustion. As the height of the layer of carbonic acid varies normally from about two and a half to five feet, according to the part of the grotto measured, it stands to reason that if one's mouth is below this height asphyxia will ensue. This result takes place with a dog led into the grotto, while the master is unaffected, both standing together, but not breathing the same air, as the man's mouth is higher than the gas. The animal recovers in a few minutes when brought out into the open air, if the experiment has not been carried too far. To show the height of the gas it is sufficient to light a candle and to lower it gently. The flame will be extinguished as soon as it reaches the gas. To demonstrate that the gas is heavier than the atmospheric air a can is taken from off the ground and the gas in it *poured* over a candle ; or a hat can be filled with it and carried outside the grotto, when it will immediately extinguish a light if poured over it.

Everyone entering the grotto feels a difficulty of breathing, at least for some minutes, as the lower layers of the gas have been disturbed, and the shorter one is the greater the discomfort.

The visit to the grotto need only occupy a few minutes, and if the tourist wishes to return to Vichy the same evening he should, as soon as this sight is over, take a carriage for the Puy-de-Dôme, that is if he intends making that excursion.

PUY-DE-DÔME.

To reach the Puy-de-Dôme from Royat a two-horse carriage is necessary if more than one person is going. The fare varies from 20 to 30 f.

The Puy-de-Dôme is one of the loveliest drives imaginable. To get to the summit of the mountain a distance of about twelve kilometres has to be accomplished. The whole distance is one steep ascent. The road is very winding with, on either side, lofty hills, covered with vegetation and rich green trees; small mountain torrents roll down by the side of the road at short intervals and innumerable streams flow on every side through the pastures. The scenery is such as is rarely to be met with. The towering mountains, rushing streams, the well-laden apple- and pear-trees in the orchards which line the road all contribute to vary the scene and make a charming promenade.

During some part of the season there is artillery practice on the heights, which the tourist will do well to bear in mind, as, while it is going on, no one is allowed to proceed beyond certain limits, that is, only about one half the distance. As the firing takes place

between 1 and 4 o'clock in the afternoon, it is possible either to make an earlier start or not to set out until about 2.30 from Royat to avoid the disagreeable enforced detention.

Besides taking the splendid view to be had from the summit of the mountain the visitor should go to Gravenoire, and descend into the crater of that extinguished volcano.

ÉBREUIL.

This excursion, with the two following, Veauche and Chantelle, may be done in the same day if a very early start be made.

It is necessary to take the train to Gannat, and then a carriage for the rest of the trip.

Ébreuil is about ten kilometres from Gannat, and a very good carriage road unites the two places.

Ébreuil, with a population of 2300, is situated on the left bank of the Sioule, upon which stream are to be seen a great number of water mills.

The origin of this small town can be traced to the earliest ages. In the eighth century it possessed a castle belonging to the kings of Aquitaine. Until 971 Ébreuil belonged to the Frank kings; it was then handed over by Lothaire to the monks, who founded a convent dedicated to St. Leger, Bishop of Autun. This convent in 108 was transformed into an abbey, and put under the immediate protection of the Holy See.

In 1115 it possessed fifty-two churches. The relics of St. Maixent did much to enrich it. About the beginning of the seventeenth century it began to lose its importance, and in 1765 Louis XVI and the Bishop of Clermont ordered the abbey to be suppressed, and established in its stead a hospital worked by the sisters of charity.

At the present day it possesses but one monument of interest, the church belonging to the abbey. The belfry is of the thirteenth century, in the "Ogival naissant" style. In the sacristy will be found some relics of St. Leger.

VEAUCE.

Veaucé is seven kilometres distant from Ébreuil. The carriage road passes through Vicq, a small village of some 1000 inhabitants, which possesses an interesting historical monument, the Château de la Mothe, now in ruins.

Shortly after passing Vicq you must leave the high road and turn to the left. In a quarter of an hour you reach Veaucé.

Veaucé is a very small village, the number of its inhabitants being only just over 200. It is built on the banks of a small stream bearing the same name. It is very picturesquely situated, and presents much artistic beauty. The "great attraction," however, is the Château de Veaucé.

The Château de Veauce is built upon some enormous rocks at a considerable elevation, and forms a majestic monument, visible at a great distance.

Round about are high hills which form a sort of semicircle. In the distance can be seen the chain of mountains of the Puy-de-Dôme and the mountains of Auvergne. Nearer at hand lies the beautiful valley of Ébreuil, and at your feet flows the Veauce, lashing the rocks in its impetuous course.

For the description of the castle we will quote P. Joanne.

"The Castle of Veauce, as its formidable position shows at the first glance, was an ancient feudal fortress. Under Richelieu the castle lost its imposing aspect and at the same time its military importance. Its walls were in great part demolished.

"In 1400 the domain of Veauce was constituted a barony by Louis II, Duke of Bourbon, and from this time it has always belonged to the family of Cadier, or to houses allied thereto. Towards the end of the seventeenth century this same family got together again all the domain, and still possess it. Restored by its present proprietor, M. de Cadier, Baron of Veauce, the castle has once more acquired its feudal appearance, with the exception of the wing occupied by the proprietor, and which is decorated in the Renaissance style.

"The large court of the castle is laid out as a garden. A wing of the castle, with a number of Gothic windows, has a crest of open-worked zinc upon its roof. The

other wing, flanked by two pavilion turrets, upon the top of which are weathercocks bearing the arms of the Barons of Cadier and of Veauce, is occupied by a gallery, in which are fifty pictures, some portraits, and fifteen complete armour suits of the family."

The Veauce church, in the Roman style, will repay a visit.

CHANTELLÉ

may be next visited, or, time not permitting a separate excursion, it may be done from Gannat, whence it is distant about fifteen kilometres. The return journey must be made by the direct road to Gannat from Chantelle. To retrace one's steps means a journey of about twenty-five instead of fifteen kilometres.

The distance separating Veauce and Chantelle is about ten kilometres. The only place of any importance that is passed on the road is the small town of Bellenave.

Chantelle, situated on the left bank of the Bouble, is a small town of 2000 inhabitants. From the fifth century this town has had its church. Later on the Aquitaine dukes built a castle, which was seized upon by Pepin in 762. This fortress, situated upon a promontory below the town, became the Bourbonnais arsenal under the Duke Louis II. It was most magnificently decorated by Anne of France, and the Constable of Bourbon had it so completely strengthened and protected in every way that it was perfectly safe

from attack. In 1527, François I had the castle dismantled, and now but very little of it is to be seen. A very handsome spiral staircase and a small building called the *Manoir of Madame Anne*, dating from the fifteenth century, is all that now remains of this once famous castle.

At the side of these ruins are the cloister (twelfth and fifteenth centuries) and the beautiful Roman church, which have been restored. They formed part of a monastery attached to the castle by the Bourbon dukes.

The parish church has a magnificent *bénitier*.

The town does a considerable business in wines. It has also numerous wool-carding factories.

We think the visitor has now quite as many excursions to choose from as will occupy him during his stay. Numerous others, however, lie within reasonable distances of Vichy, with old and curious castles well worth inspection, but the limits of this little volume will not permit of our giving further details on this head.



INDEX.

A.

	PAGE
Abattoir Spring	57
Abuse of the waters	72
Acids in relation to diet	103—106
Action of the waters upon the digestive tract	73
Albuminuria	157
Alkaline mineral waters, how they act upon the economy	14
Anæmia	188
Analysis of the different springs	70
Artificial springs	2
Ascending douches	86

B.

Barometer table, French and English	253
Bath, duration of	80
Baths	82
,, charges for	271
,, second and third class	269
Biliary lithiasis	142
Billy Castle	317
Boulevards	257
Bourbon-Busset Castle	341
Bright's disease	157

INDEX.

	C.	PAGE
Cab fares	242
Carbonic acid treatment	89
Carré Puits	27, 70
Casino	279
Catarrh, vesical	165
Celestins Springs	37, 70
Chantelle	364
Charges for carriage drives	287
Charnaux Spring	65
Château Franc, Le	3
Châteldon	346
Chemical characters of the Vichy springs	13
Chlorosis	188
Choice of a spring	73
Chomel Puits	29
Chronic cystitis	165
Clermont-Ferrand	351
Climate of Vichy	1
Clothing	96
Congestion of the liver	137
" of the spleen	193
Constipation	126
Côte St. Amand	304
Couvent des Celestins	250
Currency, French	254
Cusset	294
" springs at	295

D.

Diabetes mellitus . . . . .	.	199
Diet . . . . .	.	93
" in diabetes . . . . .	.	227

	PAGE
Different manners of employing the Vichy waters	70
Diseases of the intestines	121
,, of the liver	137
,, of the urinary organs	149
Disorders of the stomach	108
Douches	84
,, ascending	86
,, duration of	86
,, local	85
,, percussion	84
,, rectal	87
,, vaginal	88
Dubois Spring	58
Duration of baths	83
,, of digestion of certain aliments	101
,, of douches	86
,, of treatment	75
Dysentery	124
Dyspepsia	108

E.

Ébreuil	361
Efflat	333
Elimination of the bicarbonate of soda from the system	17
Elisabeth Spring	54, 70
English Protestant Church	259
Enteritis	121
Exercise	94
External uses of the waters	79

F.

Fares to Vichy	241
Forissier Spring	64
French currency	254

INDEX.

	G.	PAGE
Gall-stone colic	.	142
Gannat	.	336
Gastralgia	.	117
General analysis	.	70
,, information	.	235
Generalities upon the mineral waters of Vichy	.	10
Gout	.	170
Grande Grille	.	22, 70
Gravel	.	149
Graviers Spring	.	68
Green sickness	.	188
Grotto St. Marc	.	358
Guerrier Spring	.	63, 70
	H.	
Hauterive	.	307
,, Spring	.	47, 70
Hepatic calculi	.	142
Hepatitis	.	142
Hôpital, Civil	.	261
,, Spring	.	32, 70
Hygiene and diet	.	93
	I.	
Inflammation of the liver	.	141
Intermittent fever	.	193
Internal treatment	.	71
	J.	
Jean, Spring St.	.	57

K.

	PAGE
Kilometric and metric tables	249

L.

La Palisse	326
Larbaud aîné Spring	53
Larbaud St. Yorre	66
L'Ardoisière	300
Lardy Spring	51
Le Moutiers	3
Liver, congestion of the	137
Local douches	85
Lucas Spring	35

M.

Malaria	193
Malavaux	296
Mallat Spring	62
Manufactory of the thermal establishment	275
Marie Spring	54
Maulmont	310
Mesdames Spring	45, 70
Measure glasses	72
Metritis	128
Montagne Verte, the	290
Most favorable time for drinking the waters	71

N.

Napoleon, his visit to Vichy	7
Nephritic colics	149

	O.	PAGE
Origin of the Vichy springs	11
	P.	
Parc des Celestins	265
Parc Lardy	,	265
Parc, Spring of the	41, 70
Pavillon Sévigné	258
Percussion douches	84
Physical qualities of the waters	16
Pionniers Springs	58
Piscine	83
Pont de Rouzat	336
Post-office hours	243
Private springs	54
Prunelle Spring	59
Puy-de-Dôme	360
Puy-Grenier, the	308
	Q.	
Quantity of salts supplied by all the Vichy springs together	1
	R.	
Randan	314
Rectal douches	87
Renal lithiasis	149
Rosalie Spring	32
Royat	356

S.	PAGE
Sévigné, Madame, and her letters	4
Smoking and dyspepsia	113
Spleen, congestion of the	193
Springs:	
Abattoir	57
Carré	27, 70
Celestins	37, 70
Chomel	29
Dubois	58
Elisabeth	54, 70
Forrissier	64
Grande Grille	22, 70
Guerrier	63, 70
Hauterive	47, 70
Hôpital	32, 70
Larbaud aîné	53
Larbaud St. Yorre	66
Lardy	51
Lucas	35
Mesdames	45, 70
Nouveaux Celestins	37, 70
Prunelle	59
St. Jean	57
Ste. Marie	54
Tracy	56
Springs at Cusset	54
" at St. Yorre	61
" belonging to the State	10
" " private individuals	10
St. Louis Church	259
Stimulants	105

INDEX.

T.

	PAGE
Tea. Dyspepsia	114
Temperature of the baths	82
" springs	16, 70
Theatre	285
Thermal Company, its obligations and privileges	20
" establishment of Vichy, when founded	6
" springs of Vichy considered individually	22
Thermometer. English and French scale compared	252
Thiers	322
Tour de l'Horloge	257
Touts at railway station	245
Town of Vichy	255
Tracy Spring	56
Train service to Vichy	236
Treatment, duration of	75

U.

Uterine diseases	128
----------------------------	-----

V.

Vaginal douches	88
Veauce	362
Vesical catarrh	165
Vesse intermittent spring	291
Vichy and its origin	1
" derivation of name	3
" its climate	1
" its waters, and manners in which they are employed	70
" springs, their chemical characters	13

	PAGE
Vichy, the town of . . . . .	. 255
" waters, their physical qualities . . . . .	. 16
Vieux Parc, the . . . . .	. 262
Ville aux Juifs . . . . .	. 3
" La . . . . .	. 3



